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Coniferous Forests
and Temperate
Islands of
North America
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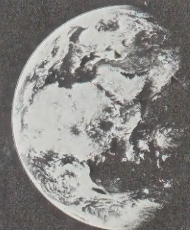
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Coniferous Forests and Temperate Grasslands of North America

L F Hobley

MACMILLAN

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1 THE TEMPERATE GRASSLANDS

North America contains the United States of America, the most powerful country in the modern world, and Canada, one of the largest and most important members of the British Commonwealth. These countries began as European colonies.

In rather more than three and a half centuries since the first little ships carrying English and French colonists reached the American shores, much of the land has been transformed; but in other parts, the coming of the Europeans has scarcely disturbed the vast stretches of pine forest and the desolate solitudes of the northern plains. The twentieth century, however, is seeing the deep penetration of these last strongholds of the wilderness.

Across most of the northern part of the continent stretched a great belt of coniferous forest. Near the coasts this passed in the south into temperate or broad-leaved forest, and in the interior the coniferous forest gave way to grassland. In the north the forest gradually thinned out into the treeless wastes of the Arctic tundra.

Gradually the colonists cleared the temperate forests, and raised crops and built cities. They used the grasslands to rear great herds of cattle. Then much of the moister grassland

was brought under the plough, and America became the granary of Europe. Meanwhile manufacturing was developed, and the U.S.A. became a great industrial nation.

This book deals mainly with the developments which took place on the grasslands and in the coniferous forests.

Of all kinds of plant, grass is the most important. It is the best food for the animals most valuable to man, and it provides man with his chief food—flour and bread. Wheat, maize, oats, rye, barley and rice from which these foods are made are species of grass.

Grass seems to grow very readily in gardens and places where it is not wanted, and there are large stretches of grassland in Britain, but most of the grassy meadows you see in countries such as England and Scotland are not natural grassland. Different kinds of plants are always struggling to take over for themselves as much of the earth's surface as possible. Where there is plenty of rain, the trees usually win this struggle, and much of Britain, western Europe and eastern U.S.A. was once covered with forest. Open grassland was found only in little patches here and there, or on the dry chalk or limestone hills, where the soil was insufficient for trees.

Fig. 1 Regions of natural vegetation.

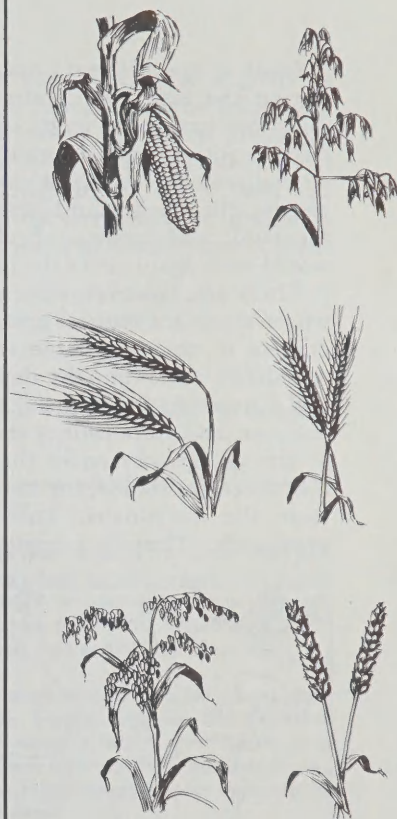
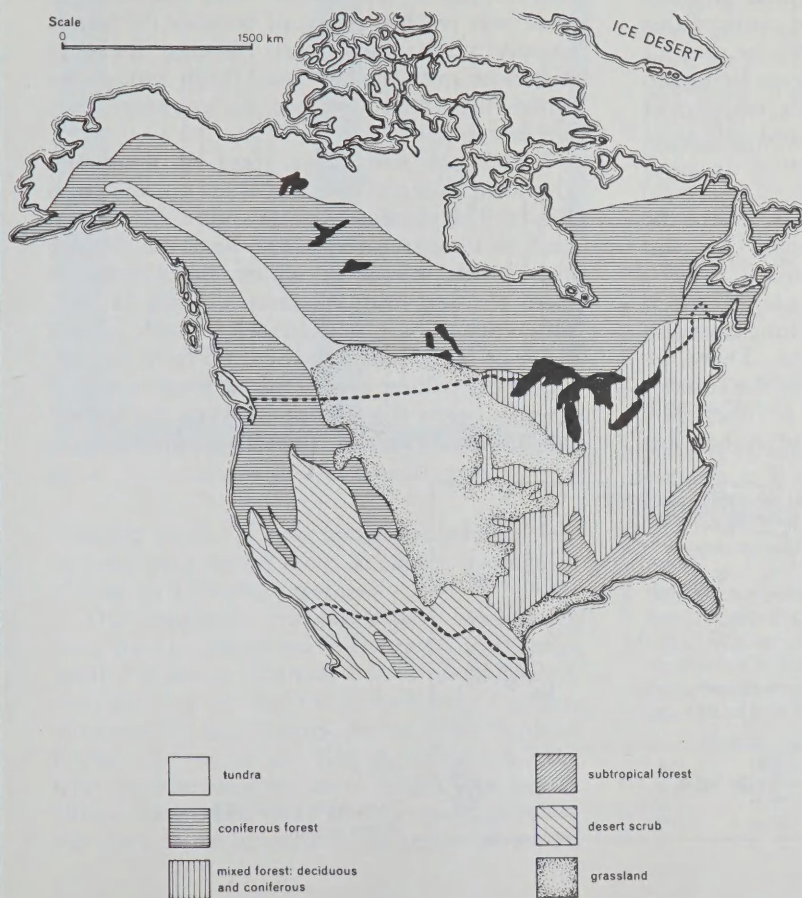


Fig. 2 maize
barley
rice

oats
rye
wheat

Most of these forests have been cut down during the last few hundred years, and the meadows have been made out of parts of this cleared forest land. If men were to die out from disease or from poisoning from hydrogen bombs, the trees would gradually re-conquer the land, and bushes, shrubs and tall trees would once again cover the lowlands.

There are, however, some parts of the world where there are natural grasslands, where the climate is not favourable to trees. The hot grasslands or savannahs described in *Deserts and Savannahs* are very dry for a large part of the year, and trees cannot stand long drought, so the tall grasses cover the land. There are also other grasslands, further from the equator than the savannahs, known as temperate grasslands. These are regions of rather low

rainfall, either because they are in the heart of the continents and so far from the sea that little rain reaches them, or because the winds usually reach them after blowing for long distances over land or over high mountains where they have dropped the moisture they are carrying.

There are five main areas of temperate grassland in the world, and these are shown in Fig. 3. The temperate grasslands differ a great deal in temperature. Those near the sea are kept much milder in winter than those far from the sea, but in summer there is little difference. There is therefore a much greater range of temperature in those far from the sea, where the coldest month may average nineteen degrees below freezing point while the hottest month may average nineteen degrees above

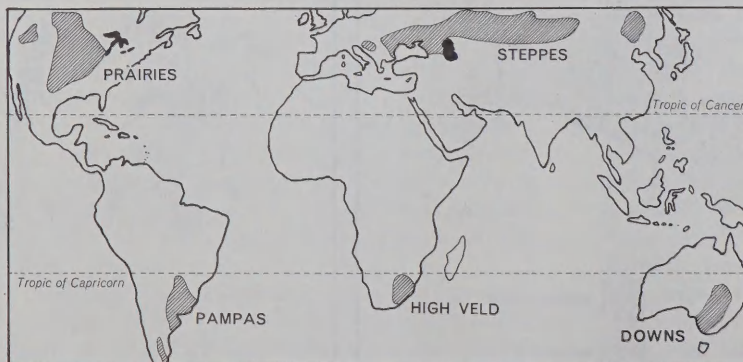


Fig. 3
Temperate grasslands
of the world.

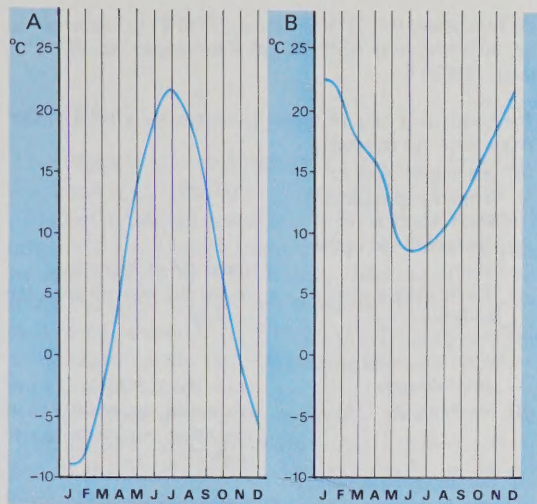


Fig. 4 Two types of temperate grasslands climate.

freezing point. The temperate grasslands near the sea may range from a winter average of 7°C to 22°C in the summer.

The temperate grasslands have never been very thickly populated in the past. They have been the home of small bands of wandering peoples, such as the North American Indians, who roamed the prairies, hunting the herds of buffalo (bison), or the Khirgiz of central Asia, who wandered with their flocks and herds. When first taken over by European peoples, the abundance of pasture naturally led to the

raising of large flocks of sheep and goats or herds of cattle and horses, but the increasing population of the world in general created a need for more and more food, and much of the grassland was ploughed for crops; and the herdsmen and sheep farmers were gradually pushed into the drier, less fertile parts of these regions.

Things To Do

- 1 On a map of the world shade and name the temperate grasslands.
- 2 Arrange the temperate grasslands of the world in order of distance from the equator.
- 3 Which of the temperate grasslands are (a) in the heart of a continent, (b) in an area where the winds reach them mainly from across the land, (c) in an area where the winds reach them mainly from over high mountains? Some of the grasslands may appear in more than one of these lists.
- 4 Here are the figures for temperature and rainfall in a grassland area in Siberia, Canada, Europe, Argentina and Transvaal. See if you can decide which is which. Find the range of temperature in each. Remember that the grasslands of Asia are furthest from the sea, those of Argentina are nearest to the sea, and so tend to be wetter.

	Hottest month	Coldest month	Annual rainfall
A	19°C	-19°C	508 mm
B	22°C	7°C	940 mm
C	19°C	-19°C	355 mm
D	29°C	11°C	406 mm
E	21°C	-9°C	483 mm

- 5 Pick out the name which should not be there in each of the following groups:
- Countries in the northern hemisphere with temperate grasslands are (Canada, Siberia, U.S.A. and Argentina).
 - States in the southern hemisphere with temperate grasslands are (Canada, Uruguay, Argentina and New South Wales).
 - (The Prairies, the Downs, the Veldt and the Pampas) have comparatively mild winters.
 - (The Pampas, Steppes, Veldt and Downs) are in the southern hemisphere.
 - Countries in America with temperate grassland are (Canada, Orange Free State, Uruguay and Argentina).
- 6 Make a list of the main temperate grasslands of the world and for each give the name, the continent, the countries which contain some of the grassland, and the latitudes between which they lie.
- 7 Arrange the temperate grasslands in order of size and say in which hemisphere (north or south) each lies.
- 8 Which of the temperate grasslands have an extreme climate?
- 9 In Fig. 4 there are graphs of the average monthly temperature in two temperate grassland regions, one in North America, the other in South America. Copy them and say which is which.
- 10 In which of the temperate grasslands are the following places? (a) Kalach, lat. $50^{\circ}38'N$, long. $41^{\circ}10'E$. (b) Pergamino, lat. $33^{\circ}45'S$, long. $60^{\circ}40'W$. (c) Weyburn, lat. $49^{\circ}40'N$, long. $104^{\circ}56'W$. (d) Maple Creek, lat. $49^{\circ}58'N$, long. $109^{\circ}25'W$. (e) Baradine, lat. $30^{\circ}52'S$, long. $149^{\circ}4'E$.
- (f) Middlewit, lat. $24^{\circ}48'S$, long. $27^{\circ}10'E$. (g) Amangeldy, lat. $50^{\circ}10'N$, long. $65^{\circ}10'E$. (h) Glenmorgan, lat. $27^{\circ}15'S$, long. $149^{\circ}30'E$.
- 11 The heads and tails of these sentences have been mixed. Write them out correctly.
- The largest areas of temperate grassland in North America are in Canada.
 - The grasslands of the Veldt are found in Argentina.
 - The temperate grasslands are nearer the equator than the prairies.
 - The coldest part of the North American temperate grasslands are in the U.S.A.
 - The Pampas are nearer the equator than the other temperate grasslands.
 - The tropical grasslands are outside the tropics.
- 12 Select the right word from each bracket in the following paragraph, and write out the paragraph correctly.
- 'The temperate grasslands in the northern hemisphere lie (north, south) of the tropic of Cancer, so the sun is (sometimes, never) right overhead at midday. In June the shadows point (northwards, southwards) at midday, and in January they point (northwards, southwards). The winters are (cold, mild) and rather (dry, wet), because they are (far from, near to) the sea. They have a (large, small) range of temperature. The temperate grasslands of the southern hemisphere are (further from, nearer to) the equator than those of the northern hemisphere. They are also (milder, colder) in winter and have a (greater, smaller) range of temperature.'

Canada

The temperate grasslands of North America are known as prairies. They stretch for many hundreds of kilometres, from the forested lands of the Great Lakes and the Mississippi to the slopes of the Rocky Mountains, and from the pine forests in the north to the deserts and semi-deserts of the south-west and the temperate and sub-tropical forests of the south-east.

The northern and western parts of the prairies are covered with short buffalo grass, but in the south and east grows the long, moist blue-stem grass.

In the east the prairies are very level, less than 300 metres above sea level and covered with deep, fertile soil which was brought by glaciers long ago. A central section is mainly between 300-1,000 metres high, and consists of rolling plains, while the western part of the prairies, between 1,000-1,500 metres high, is in some parts more hilly but in others, slopes

so gradually that it appears to be perfectly flat.

The amount of rainfall usually decreases from east to west, but the amount varies a great deal from year to year especially in the west, where a place may have 200 millimetres one year, 100 millimetres the next and over 500 millimetres the next. Winnipeg averages a little over 500 millimetres and Calgary about 330 millimetres. Further south and south-east it is much wetter but to the south-west it is drier.

In Canada and northern U.S.A. the winters are cold and a thin layer of snow covers the soil, which remains frozen hard for several months. Sometimes a mild wind penetrates from the south. Warm westerly winds called the Chinook may raise the temperature from -22°C to above freezing point in a few minutes. The spring thus usually comes suddenly: one day it is winter, the next it is spring. The snow melts rapidly, and provides

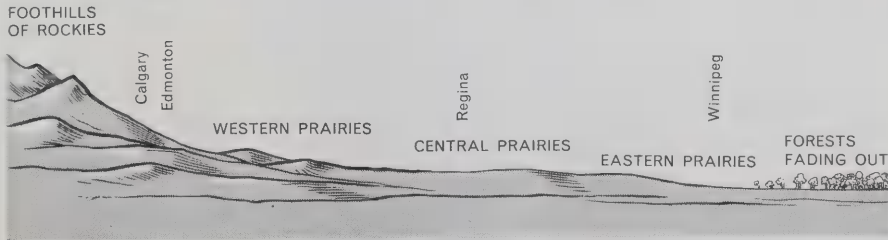


Fig. 5

Section across
the prairies.

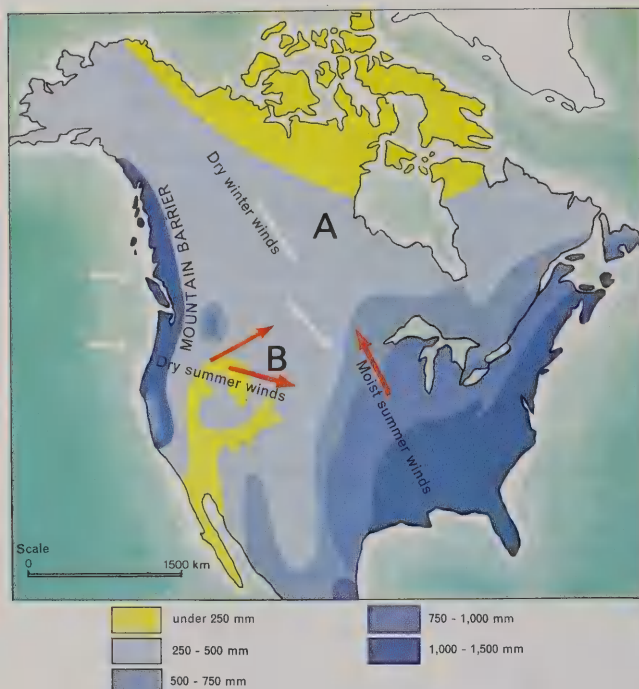


Fig. 6 Annual rainfall. Why are the winds marked A and B dry ones?

plenty of moisture for the new grass, the crops and the spring flowers which cover the prairie as if by magic.

The wind always seems to be blowing across the prairies. In winter it swirls the snow over the frozen plains, penetrating everywhere; in summer hot dry winds raise clouds of dust.

There are no sheltering belts of trees or lines of hills. Only around the farmhouses a few trees give some protection.

When the white settlers first began to occupy the prairies, they found them inhabited by small tribes of Indians who lived mainly by hunting the bison, which is generally known as the buffalo. Huge herds containing tens of thousands of animals wandered over the plains, moving southwards in autumn, and then advancing northwards again in spring as the snow melted and fresh pastures grew. The Indians followed the herds, cutting out a few animals from the rest and killing them with spears or bows and arrows.

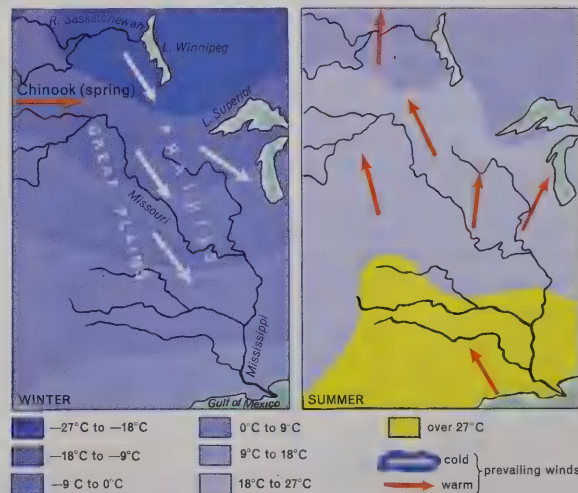


Fig. 7 Summer and winter temperatures in the prairies. Would you expect the Chinook to be a wet or a dry wind? Give your reasons.

The whole way of life of the Indians depended upon the buffalo: the meat was eaten fresh in summer and dried or smoked for the winter. The hairy hides were made into cloaks and sleeping bags for the cold winters, or scraped and stitched together to form tents.

The fat provided fuel, the bones were used to make tools and weapons and the sinews made good bowstrings.

The white men shot the buffalo for food and hides, and soon reduced their numbers to a tiny fraction of their former abundance. The



Fig. 8(a)

Prairies in summer.



Fig. 8(b)

Prairies in winter.

Indians' hunting grounds were then used for raising cattle on huge ranches. The Indians fought the intruders, but they were killed or driven back into less hospitable areas.

More and more settlers followed the pioneer ranchers, bringing their belongings and families, and many of them began to grow crops. The big ranches were divided up into smaller farms by thousands of kilometres of barbed wire fences. In some parts sheep were reared, in others crops were raised. The ranchers moved westwards, on the heels of the Indians.

The prairies of Canada and the northern states of the U.S.A. were found to be very good for wheat growing. The soil was deep and fertile, with neither trees nor stones to hinder ploughing. The spring thaw left the ground moist for starting growth, and most of the rain fell in the late spring and early summer, after which a warm dry spell ripened the grain.

The chief drawback was the shortness of the season, which meant that the work of preparing the soil, sowing and harvesting had to be crowded into a few months, and done as quickly as possible. A great deal of machinery was used: huge multiple ploughs turning ten furrows at once, and harvesters which cut a strip over 6 metres wide, were drawn across huge fields by large teams of horses, sometimes as many as twenty-four horses in a team. Today, of course, tractors have replaced the horses, and the work goes on far into the night by the light of strong headlamps.

When the land was first occupied, the level stretches of prairie were divided up by straight lines into 'sections' 1.6 kilometres square, and these were sub-divided into half and quarter sections. Most of the farms were half sections, 1.6 kilometres long and 0.8 kilometres wide. Each farmer had to find his own water supply and he built his farmhouse near it. A wind pump usually drew up the water and stored it in a large tank.

As the tide of wheat farmers advanced westwards across Canada, railways were built to carry back the grain to the cities of the east and to the countries of Europe. By 1885 the Canadian Pacific Railway spanned the 1,600 kilometres of prairies, crossed the Rocky Mountains and reached the Pacific. The wheat farmers surged forward. Manitoba became the chief wheat-growing province, and Winni-

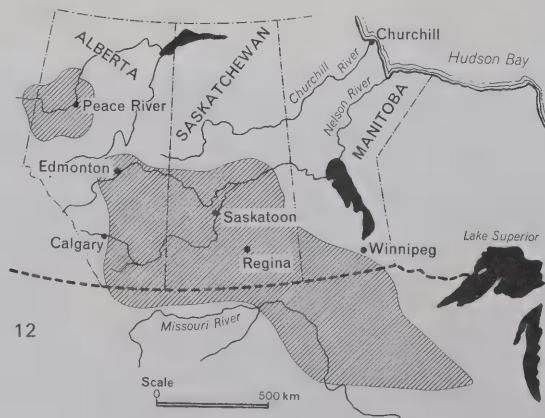


Fig. 9 Spring wheat belt. The wheat belt has no distinct boundary and many other crops are grown within the belt besides wheat. The crop belts are less distinct than they used to be, and there is much overlapping and intermingling.

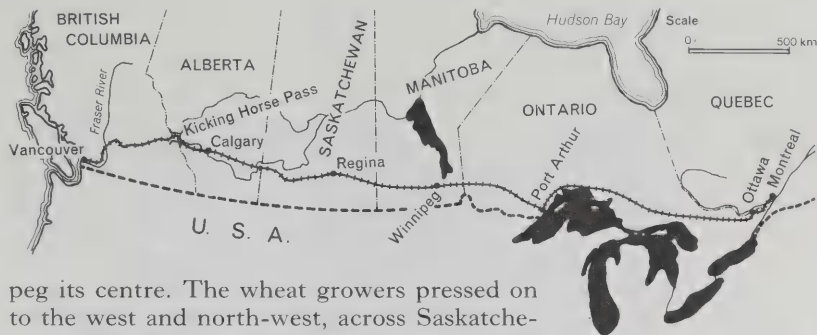


Fig. 10

The Canadian Pacific railway.
What is the approximate
distance from
Montreal to Vancouver?

peg its centre. The wheat growers pressed on to the west and north-west, across Saskatchewan. Killing frosts in the north ruined the crop before it could be harvested. Drought in the west beat back the farmers more than once; but they learned to conserve the moisture in the soil by 'dry farming', that is, by growing wheat in strips, and leaving alternate strips fallow, and ploughing into them the rubbish and stubble from the wheat strips. The surface of the fallow land was kept broken up by frequent harrowing, as this prevented the moisture from being drawn up to the surface. Most of the year's rain was therefore kept in the soil ready for the next year's wheat crop.

In Ottawa experiments were constantly being carried out to find better methods of wheat growing, and to produce new varieties of wheat which would grow in drier climates, or which would ripen more quickly. Early in the twentieth century the famous Marquis wheat was produced. It ripened a full week earlier than the older kinds. In 1904 there was less than half a kilogram of this wheat in

existence; by 1918 the crop raised from it was worth more than £120 million. Other drought-resisting kinds of wheat were produced, so that wheat could be grown further west. Soon Saskatchewan had become the largest wheat producing province, and wheat growers were pressing on into Alberta, which soon was producing as much as Manitoba, where less wheat was now being grown as farmers introduced barley and other crops and dairy farming.

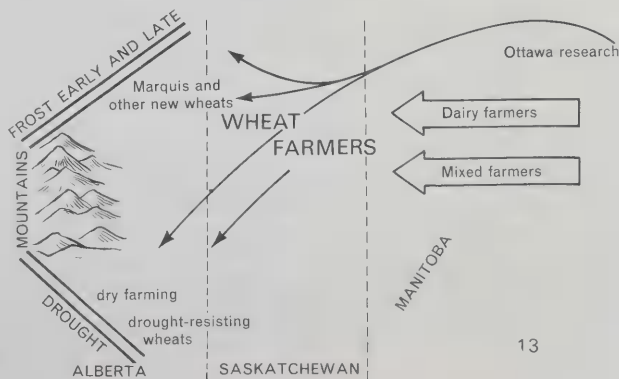


Fig. 11 Factors in wheat farming.
Can you explain the meaning of the
various details in this diagram?

The life of a wheat farmer's family was a lonely one. There were scarcely any towns or villages, and at first few railways. In winter the farmhouses were often snowed up, and the only method of travel was by snowshoe, skate or sledge. Supplies of food and fuel were laid in, and the family settled down to the long wait for the spring. Nowadays cars, aircraft and a network of railways make travel easy and the winter is a holiday time of visits and parties. The air is cold, but dry, pleasant and invigorating.

The thaw comes in April, and then as soon as the sticky mud dries a little, the land is ploughed and harrowed and prepared for the seed. Not a minute must be lost, and by early May most of the sowing is finished. June, July and early August are the wettest months, but there is usually none too much rain, and the wheat ripens well, and most of it is reaped by the end of August. The farmer ploughs the land which has lain fallow, before the frost sets in. Meanwhile other crops are being harvested. Today most wheat farmers grow



Fig. 12

A modern prairie farm in Saskatchewan.

What do you think is the

main type of crop grown here?

Can you identify the farm house, barn and granaries?

How does this farm differ from the usual type of farm in Britain?

Fig. 13

Grain elevators,
alongside the railway line,
Bradwell, Saskatchewan.



oats and barley, and often sugar beet and flax. Pigs are fed on the barley, poultry are kept and some dairy cows. This is sometimes called the cow-sow-hen-grain farm. Today the total production of oats and barley in the prairie provinces is almost equal to that of wheat.

The wheat must be sold before winter. The grain is threshed as the corn is cut and poured straight into the waiting trucks. These take it to storehouses called elevators, where it is sucked up by pipes. It is then taken by rail in forty-ton or sixty-ton 'box cars' to the nearest

waterway, where it is poured into lake steamers called whalebacks, or into ocean-going vessels. So quick are modern methods that a ship which used to need seven days' labour to load or unload, can now be dealt with in one hour. After its voyage the grain is again sucked up into elevators or flour mills. Thus the grain is untouched by hand until it reaches the baker in the form of flour.

In the autumn hundreds of trains converge upon Winnipeg, where there are over five hundred kilometres of railway sidings, to deal with the millions of tons of wheat. There it is tested and graded. Canada grows far more wheat than she needs for her own people, so most of it is exported. A great deal of it follows the easterly route via the Great Lakes and the St Lawrence, but since the opening of the Panama Canal in 1914, most of that grown in Alberta has been sent by rail to Vancouver, and then by sea through the canal.

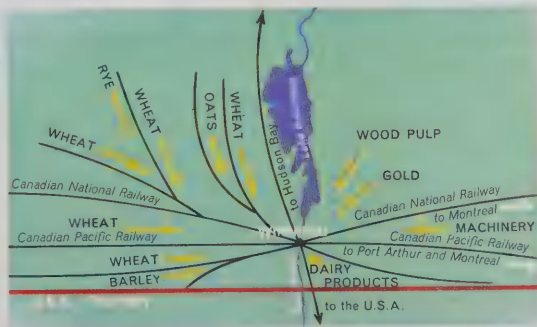


Fig. 14 Position of Winnipeg. Put into words the points made in this map, explaining why Winnipeg is important, and why it grew up just there.

The figures represent the approximate percentage of the total amount of wheat exported using each route. Of the total exported from Canada what percentage goes overseas? Where does the rest go?

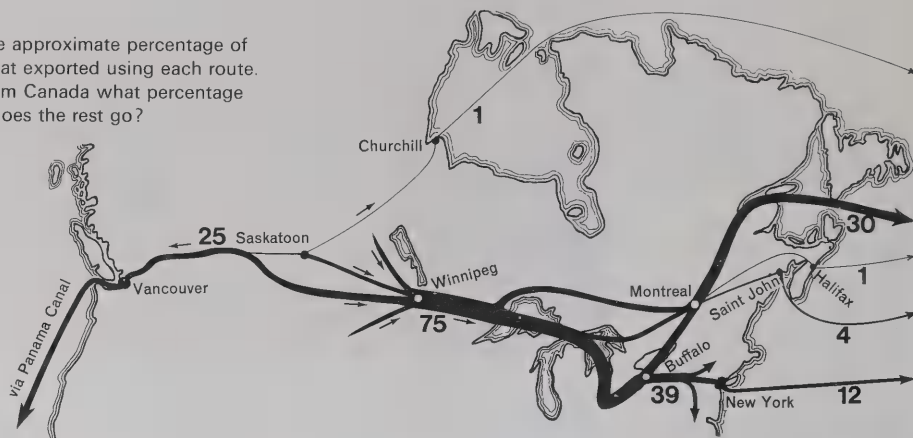


Fig. 15

Wheat export routes.

From Port Arthur on the Great Lakes, the wheat follows the busiest inland waterway in the world, across Lake Superior, through the Sault Ste Marie or 'Soo' Canals which avoid the rapids between Lake Superior and Lake Huron, across Lake Huron and Erie and by the Welland Canal past the Niagara Falls and

down the St Lawrence Seaway to Montreal. Until 1959, when the St Lawrence Seaway was opened, only very small ships could make the whole journey. From the Upper Lakes to Kingston on Lake Ontario cargoes were taken by specially built ships called 'lakers' which were up to 218 metres long, 22 metres broad and able to carry 25,000 tons. Between Kingston and Montreal was a stretch of about 290 kilometres with many rapids which were bypassed only by small canals 4.27 metres deep. Between 1954 and 1959, however, new deep, wide canals were cut to make the St Lawrence Seaway, and the lakers can now go all the way to Montreal, and ocean liners of up to 9,000 tons can sail the 3,680 kilometres from the open Atlantic to ports on the far side of Lake Michigan and Lake Superior.

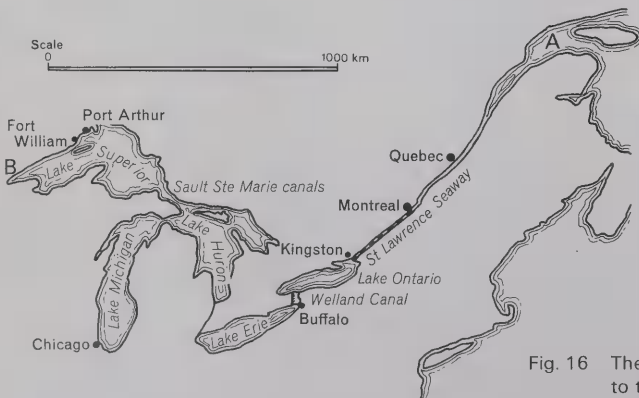


Fig. 16

The St Lawrence Seaway: the sea route to the heart of North America

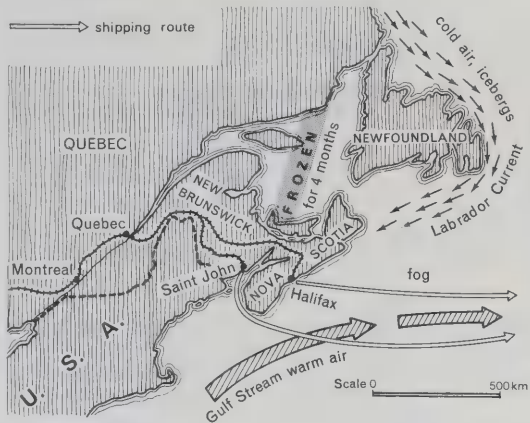


Fig. 17 Wheat export routes in winter

This is still no easy journey, for on these 480 kilometre long lakes, storms arise as bad as those on the open ocean. The lakes are frozen over by December, and for four months the wheat ships are idle. Meanwhile wheat piles up in the elevators at Port Arthur and Fort William, and some of it goes by rail.

Montreal is also frozen up by December, and the wheat now goes on by rail to Halifax and St John, which are ice-free all the year. A great deal of the wheat leaves the St Lawrence route at Buffalo, where it crosses the U.S.A. border, and goes on to New York, and so the wheat continues to come to Europe throughout the winter.

The shortest route from the prairies to Britain is through Hudson Bay, and some of

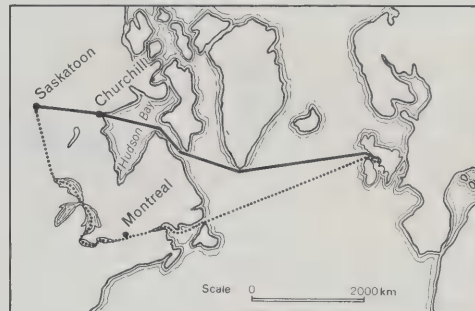


Fig. 18 The Hudson Bay route on many maps looks as though it is longer than that via the St Lawrence. This is because most maps tend to exaggerate sizes and distances in the north. This map shows correct sizes.

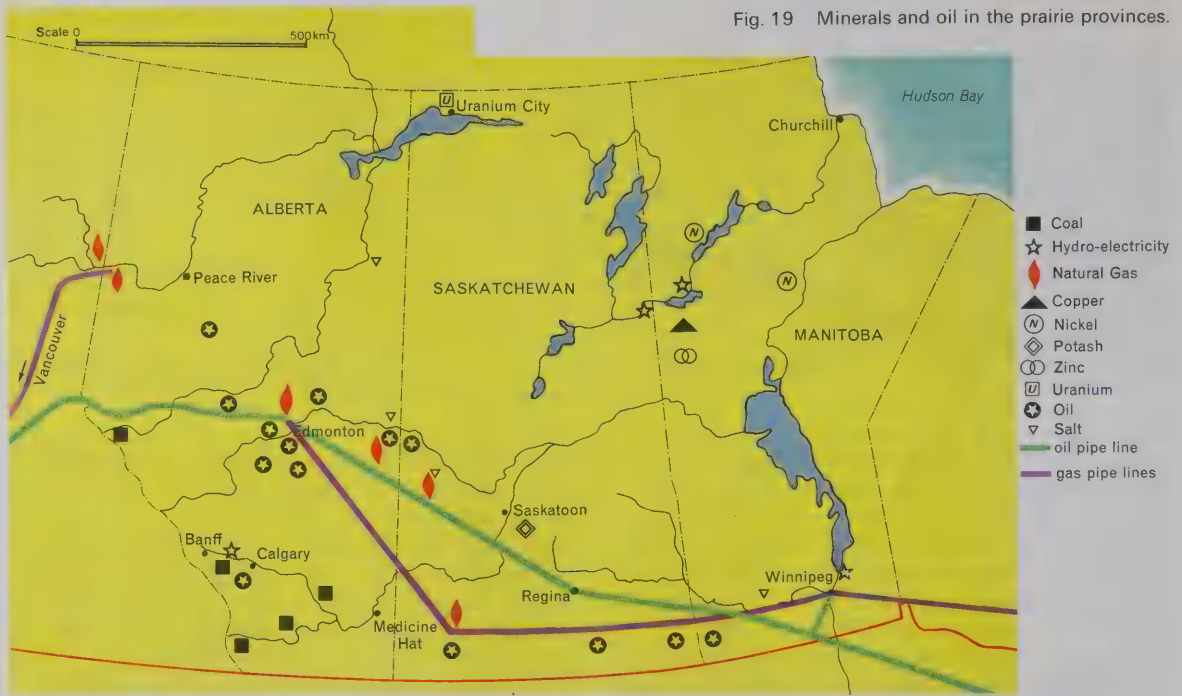
the wheat goes to Churchill by rail, and then across the Bay and through Hudson Strait, but because of the ice, ships can use this route only between the beginning of August and the end of October, during which time they must sail in, load up and sail out again before the ice closes in. Even then there is danger from icebergs in the Strait and the Atlantic.

Only the Vancouver-Panama Canal route is completely ice-free, but the ocean voyage is much more than twice as far as by any other route.

Where the prairies of Alberta pass into the foothills of the Rockies, crop raising gives way to stock rearing, and this is the area of the great ranches and the Canadian cowboys.

In recent years mining and manufacturing

Fig. 19 Minerals and oil in the prairie provinces.



have become increasingly important, and the value of mineral production of the prairie provinces now exceeds that of all the field crops. Most valuable are petroleum and natural gas, but coal, uranium, gold, copper, zinc, silver, nickel, cadmium, iron and salt are also important.

The oil and natural gas are piped from Alberta to the Great Lakes and also through the Rocky Mountains to Vancouver. Calgary and Edmonton are growing rapidly, and developing a chemical industry. Edmonton has a huge plant for the production of artificial silk and other synthetic fibres.

Things To Do

- 13 Draw a map of the prairies of North America. Show the rivers, lakes and mountains, and the boundaries of the countries.
- 14 Imagine you are making a journey along the boundary between Canada and the U.S.A. from the Great Lakes to the Pacific. Describe the sort of country you pass through, whether it is flat or mountainous, forested or grassy, and so on. Why is this boundary different from most boundaries between countries? What does it follow?
- 15 Draw a map of the three wheat provinces of Canada and show the wheat belt. Within the wheat belt put one dot for every 25 million decalitres of wheat grown. These are the figures for 1963, a record crop of 2,632 million decalitres.

	million decalitres
Alberta	542
Manitoba	222
Saskatchewan	1795

- 16 Draw a section along the Canadian Pacific Railway from Port Arthur to the Kicking Horse Pass. Mark on it the chief towns and the type of country and farm products.
- 17 Here are graphs of the temperature and rainfall for the wheat growing areas of Manitoba and East Anglia. Can you tell which is which? What are the main differences, and how do they affect farming?

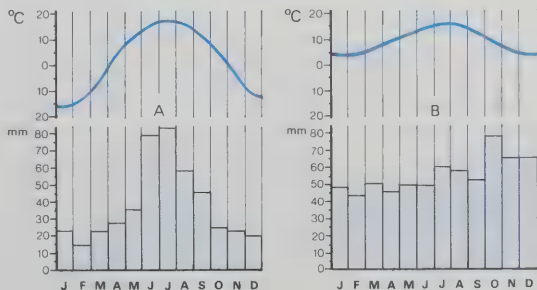


Fig. 20

- 18 Here are the annual amounts of rainfall at Medicine Hat, in southern Alberta, over a ten year period. What was the amount of rain in the wettest year, in the driest year and what was the average? Make a graph of the figures.

107 183 218 249 295 119 272 246 556 211 mm

- 19 Here are some diagrams comparing Saskatchewan with Britain. The first one shows areas; as you can see, Saskatchewan is more than twice as big as Britain. Of the others, one shows population, one hectares under wheat and one all the crops other than wheat. Can you tell which is which? Write one short sentence about each of these, similar to the sentence above about area.

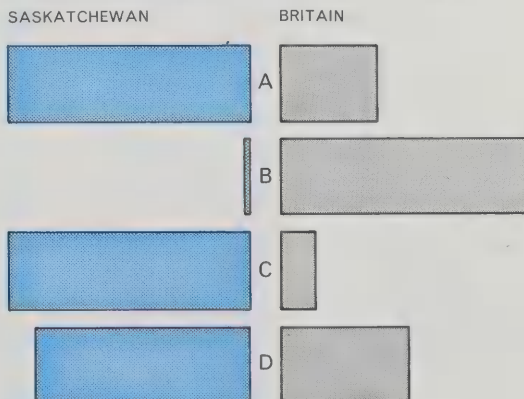


Fig. 21

- 20 Draw a map of southern Canada and put in the Canadian Pacific Railway from Montreal to Vancouver. Name the provinces and chief towns.

21 Make a timetable for the Dominion Express, the train which runs on the Canadian Pacific Railway from Montreal to Vancouver. It leaves Montreal at 7.30 pm and reaches Ottawa, 178 kilometres away, in two hours and ten minutes. It arrives at Port Arthur, nearly 1,450 kilometres further west, the following evening at 10.15 pm. Winnipeg, 2,267 kilometres from Montreal, is reached the next morning at 9.30 am. Regina at 6.45 pm next evening and Calgary the following morning at 8.20 am. It takes 25 minutes more than 24 hours to go from Calgary to Vancouver. How many days and nights does it take from Montreal to Vancouver?

22 Fig 15 shows the main routes by which wheat is exported from Canada. The figures after the names show the percentage of the total that passes through these places. If Canada exports 1,274 million decalitres in an average year, how much leaves by each route?

23 It is cheaper to send wheat by water if possible, even though the journey by sea or river is much longer. Which way would you send wheat to Britain if you had a farm at

- (a) Saskatoon,
- (b) Winnipeg,
- (c) Calgary.

Use Fig. 22 to help you in your answer.

24 Divide a page into squares, and in each draw or stick on a cut-out picture to show the various processes in the production of bread, starting with ploughing the prairies. First make a list of all the processes.

25 Here are the figures in millions of decalitres for the export of wheat and flour from Canada. Make a graph of them and write a sentence or two about the export of wheat from Canada during the last 70 years.

million decalitres

1890	4	1920	426
1900	73	1925	877
1905	73	1930s	909
1910	229	1950s	1091
1915	342	1960s	1272

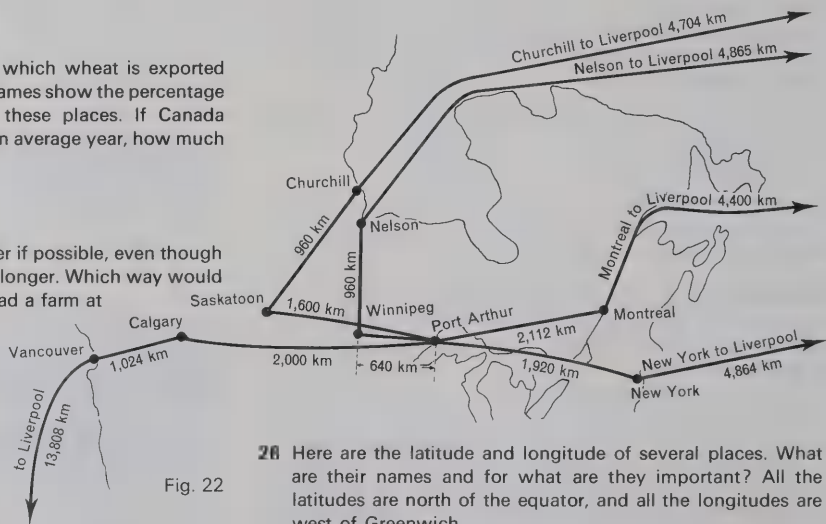


Fig. 22

26 Here are the latitude and longitude of several places. What are their names and for what are they important? All the latitudes are north of the equator, and all the longitudes are west of Greenwich.

- (a) 49°55' 97°15' (b) 49°14' 122°50' (c) 48°30' 89°22'
- (d) 58°45' 94°0' (e) 62°0' 70°0' (f) 53°40' 113°30'
- (g) 51°2' 114°5' (h) 52°10' 106°38' (i) 45°42' 73°50'
- (j) 46°30' 84°24' (k) 44°45' 64°0' (l) 9°30' 79°45'

- 27 Here is an account of what was seen from an aeroplane on a flight from Montreal to Vancouver, but some of the items are in the wrong order. Write it out again in the right order.

'We see the wide St Lawrence river below us, but we leave it on our left. We now fly across part of Lake Superior to Port Arthur. We follow the Ottawa river to Ottawa, the capital of Canada. We fly along the northern shore of the lake until we see below us the rapids that separate it from lake Superior. We cross a wide stretch of land until lake Huron comes in sight.

Leaving the Great Lakes behind we cross hilly forested country, but then it flattens out. The land rises a little and we see fewer wheat farms and more cattle ranches. First mixed farms and then wheat farms occupy much of the land. The land rises steeply and we reach the Rockies. Here the great city of Winnipeg is a centre of many railway routes. We pass more and more wheat farms. Finally we fly down a winding valley to Vancouver.'

The United States of America

The wheat belt extends across the border into the U.S.A., and in fact, it was there in Illinois that the prairies were first settled. At first men thought it would be a waste of time to try to grow crops where trees would not grow, and they preferred to settle in wooded areas, clearing the forest, slowly and laboriously cutting down and burning the great trees, and adding a few square yards of fresh land to their farms each year. At last, however, some pioneers did try to cultivate the prairie, but when they attempted to plough it, the wooden and cast iron ploughs in use then were unable

to cut into and turn over the thick, matted turf. Then heavy, sharp steel ploughs were invented, and the cultivation of the prairie went ahead rapidly. In the north, spring-sown wheat was the main crop, as it was in Canada. In the south, autumn-sown wheat was grown, but in the central area Indian corn or maize soon became the most important crop.

In the warm moist summer the maize grows rapidly, as much as 5 centimetres in a single night. It can actually be heard growing, and farmers go out on a still night to listen to it—a strange creaking, rustling sound. By late



Fig. 23 Crop belts in the U.S.A. Can you explain the bulge in the general farming belt at A?

summer it may be as high as 4.5 metres. The yield is tremendous: although a field of maize requires only one twelfth as much seed as a field of wheat, it yields several times as much grain, often 150 tons per hectare.

Most of the maize is used for feeding animals (cattle, pigs, sheep and poultry) so the American people eat their maize mainly in the forms of beef, pork, lamb, poultry, milk, cheese, butter and eggs.

The maize farms are large, though not quite

so large as most Canadian wheat farms, but so much machinery is used that the farmer needs scarcely any labour besides that of his family. Most farmers keep a good many livestock. They buy cattle from the ranches in the west, and fatten them for sale as meat. When they buy them, the animals are long, lean young bullocks, but a few lazy weeks with plenty of maize and other foodstuffs to eat, plenty of water to drink and scarcely any exercise turns them into fat heavy animals with plenty of meat. The farmer turns twenty kilograms of maize and fodder into one kilogram of beef which costs far less to send by rail, and brings in a far better price. The pigs, which the farmers rear themselves, turn the maize and fodder into meat at an even greater rate.

The maize farms are not grouped round villages or country towns as farms are in Britain, but each farming family lives in the midst of its own fields, often out of sight of neighbours. Towns have grown up to act as trading centres for the scattered farmers who, with their families, go to town to church and to meet their friends at parties and dances, as well as to transact their business. The children are taken to the school in town by bus. On the whole the people of the maize belt are hard-working and prosperous.

Long after the moist tall-grass prairies had been settled, the western short-grass prairies remained empty and desolate. It is a vast flat



Fig. 24 Machinery being used to harvest maize.

land across which the winds are always blowing—scorching winds in summer, bitterly cold in winter, and always dry. Here water is said to be worth more than property. For long the American map makers labelled this whole region 'The Great American Desert'. Sometimes no rain falls for a year: rivers dry up and their beds are filled with drifting sand. Then torrential rain causes devastating floods. People crossed these prairies on the way to the Pacific coastlands, but they did not stay. The only signs of man were the deep tracks of the great horse-drawn covered wagons, and the scattered tribes of Indians hunting the buffalo.

Then came the railways to link the east with the Pacific coast. In a few years the buffalo were slaughtered almost to extinction, and the Indians were forced to move elsewhere. Cattle and cowboys took their place. Great herds of half-wild cattle were raised on the unfenced prairies. Cowboys rounded up the cattle, branding the calves and picking out the animals that were to be sent to the cities of the east. They were driven to the nearest railway, which might be hundreds of kilometres away. Movement would be slow, as the herd looked for pasture on the way. Each day cowboys would ride on ahead, looking for a watering place. At night the cowboys would take it in turns to ride round the herd, preventing them from wandering, and singing long, sad, slow ballads which helped to calm the restive

animals. There was always the danger of a stampede: an unexpected noise, or a grass fire might cause a sudden panic, and the whole herd would dash off in a frantic rush, trampling down everything in their way. At last the railway was reached, the cattle were sold, and the cowboys spent their money in wild celebrations.

Refrigerator railway vans were invented, and the demand for meat increased. The ranches spread further and further west and north. Indians contested their advance, cattle thieves robbed them, scorching droughts, grass fires and killing blizzards destroyed the cattle by the million. The new ways of keeping meat by canning and refrigeration were being increasingly used, and it was found that good quality meat for such purposes was not to be obtained from great open ranches. Barbed wire fences and railways cut up the open country, and smaller herds of better types of animals were beginning to be reared. Many of these were sent to the richer pastures of the east to be fattened before killing.

Meanwhile the crop farmers were advancing behind the ranchers, reaching out westwards as streams of people, hungry for land, rode out on the railways and took up pieces of land which were given free to any who promised to stay and farm for five years. Houses were built, wells dug and land fenced in. The days of the cowboy were numbered.

As the richer tall-grass prairies were taken for crops, the ranchers were confined to the drier, poorer pastures of the short-grass prairies of the High Plains. Here calves were reared until they were about a year old, and then they were sold to the crop farmers for fattening. Some of the poor pastures were ploughed, and better grasses or alfalfa and other fodder crops were grown. Many ranchers now join together in co-operative grazing associations to plan the use of the land and the raising of the livestock. They decide how many animals should graze in each section of land so that the pasture will not be ruined by having too many animals on it. They decide which land should be ploughed and sown with

better grasses or other fodder. Much of the fodder is made into silage. Freshly cut unripe maize, grass, bean stems and other juicy plants are chopped up and packed tightly in wide trenches. Molasses, a sugary syrup, is poured over the mixture, which is pressed down and then covered with straw and earth. In the winter the trenches are opened up and the contents provide very nourishing food for the livestock.

On the slopes of the Rocky Mountains sheep are reared, grazing on the higher pastures in summer, and being driven down to the lower slopes in autumn.

The whole area of the Great Plains is still one of scanty population. Denver is the only

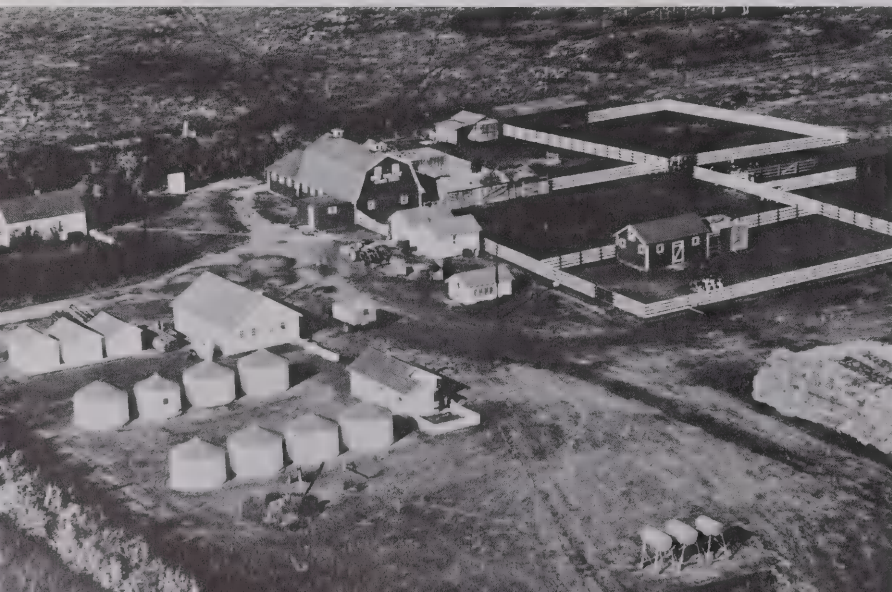
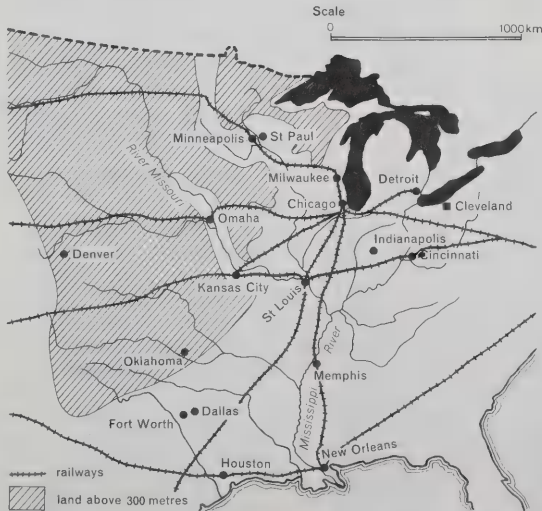


Fig. 25

A cattle farm
in the Bow River valley, Alberta.
Where do you think
most of the cattle are?
For what purposes do you
think they are reared?

Fig. 26

Denver, the largest city
of the Great Plains.
What is there in this picture
which suggests the prairies
to you?



big city. It first grew up as a stage on the great trek to the west, a place where traders and trappers met one another and the early settlers. When gold was discovered in the west, many gold seekers operated from there, and when silver was discovered Denver became the centre of the silver mining industry. Now it is a great collecting centre for the produce of the Great Plains. Various foods are processed and huge quantities of meat are packed. No other town on the Great Plains is much more than a tenth the size of Denver.

Many great cities, however, have grown up

Fig. 27
Cities of the mid-west.



Fig. 28

Chicago.

in the eastern prairies, in the long-grass areas, to deal with products which pour eastwards on the railways. Minneapolis is a great flour-milling centre, and St Louis has huge stockyards and cattle markets. Chicago has the largest stockyards in the world. In its 10,000 factories bacon and lard are made, meat is processed and canned, and shoes and other leather goods are manufactured from the hides. Glue is made from the hoofs, and brushes from the hair and bristles. In fact, Chicago is said to use every part of the pig but its squeal. Iron ore comes to the city by way of Lake Michigan for the manufacture of tractors and many other kinds of farm machin-

ery. Large quantities of grain, coal and timber also come into the harbour. Chicago is the world's greatest railway centre.

The short-grass prairies are also being brought under the plough. The land appears quite flat, although it slopes very slightly upwards towards the Rockies. The air is dry and clear and there are no trees, ridges or hollows to obstruct the view. Somebody once said, 'You would see a visitor coming at sun-up and watch him coming all day, and then he didn't get to your place until half an hour late for supper'.

For a long time there was a struggle between the farmers, who enclosed the land, and the

ranchers and Indians who wanted it open and unfenced, but the barbed wire fences and the steel wind pumps which gave the farmers a constant supply of water, gave the cultivators the victory. By using special types of wheat, by alternating wheat with alfalfa and other crops, by ploughing along the slope where there was any, by carefully preserving every drop of available water, and by extensive use of machinery, the farmers can produce a good crop.

The wheat is harvested by huge machines which cut off the heads and shake out the grain, which is poured into the accompanying lorry. The chaff and straw are spread over the ground ready for ploughing in. The harvest must be reaped quickly, but as many farmers cannot afford several of these large machines, teams of harvesters go from farm to farm, working all day and often half the night,

especially if bad weather threatens. In the south the wheat harvest begins in May, and the teams work steadily northwards until by August they have reached the Canadian border, and are harvesting the spring wheat of North Dakota. So, from south to north, the Great Plains are no longer the Great American Desert, but, through man's energy and inventiveness, have become a growing source of food supplies, both meat and grain.

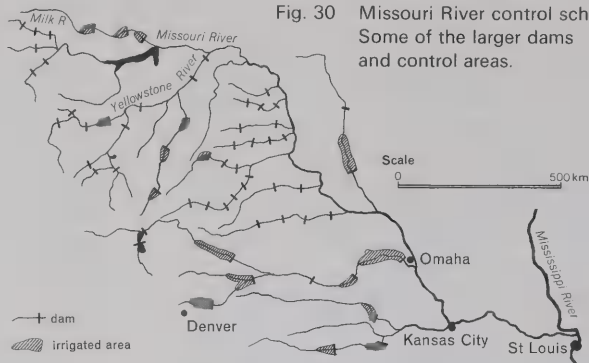
Farming there is by no means easy and safe, however. Through the heart of this prairie region of the U.S.A. runs the river Missouri, the 'wild Missouri', 4,000 kilometres long, and the most destructive river in the United States. Sometimes, swollen by melting snow and torrential rains, it rages through the country, spreading ruin and death to millions of hectares of farmland, and leaving hundreds of thousands homeless. Huge quantities of

Fig. 29

A team of self-propelled combines harvesting wheat. Why do you think the team works in a staggered line, instead of in a line abreast?



Fig. 30 Missouri River control scheme. Some of the larger dams and control areas.



soil are torn from the land by the force of the flood waters, carried along with uprooted trees, shattered buildings and other debris, and dumped upon the growing crops. The muddy water has been described as 'too thin to plough and too thick to drink'.

Now the huge task of taming the giant river is being undertaken. Dams, reservoirs and navigation canals are being constructed, and when the scheme is finished, the river will be brought down 3,200 kilometres in a series of over a hundred reservoirs. This is all part of one of man's greatest triumphs over nature, gained during the nineteenth and early twentieth centuries—the opening up of the prairies and the Great Plains of America, and the turning of the 'Great American Desert', one of the emptiest and least productive regions of the world, into one of the most productive.

Things To Do

- 28 Draw a map of the prairies of the U.S.A. and show the state boundaries. Name the states.
- 29 Draw a map of the prairies of the U.S.A. Show and name the rivers and chief towns, and shade or colour the spring wheat, the maize and the winter wheat belts.
- 30 Draw a map of the prairies of the U.S.A. and show the rivers and main railways and colour or shade the high land.
- 31 Wheat is harvested somewhere in the world at almost every month of the year. Make a list of the months, and as you read through this and other books fill in the names of the countries where it is grown, opposite the appropriate month. Not all the months will have the name of a temperate grassland region. Can you find other countries where wheat is harvested during these other months? (India, Egypt and places with a Mediterranean climate, grasslands of Australia and South America).
- 32 Make a coloured picture of a maize farm: a white-washed, wooden farmhouse, very large machine sheds and barns painted red, with one extra large barn for storing maize, a tall wind pump on steel girders, and a group of trees to shelter the buildings. There are straight roads, large square or rectangular fields, some of shiny green maize, and narrower strips of pale oats, yellow barley, golden wheat or dark green millet. There will be small paddocks near the farmhouse for poultry, hogs, bullocks, dairy cows, horses etc.
- 33 Here are the latitude and longitude of several places. What are they and for what are they important? All latitudes are north of the equator and all longitudes are west of Greenwich.

(a) Lat. 45°0'	Long. 93°30'	(e) Lat. 39°4'	Long. 94°37'
(b) " 38°40'	" 90°30'	(f) " 45°5'	" 93°15'
(c) " 41°50'	" 87°50'	(g) " 41°28'	" 96°12'
(d) " 39°50'	" 104°52'		

34 Near which of the following would you expect spring wheat to be grown, and in which winter wheat?
 Calgary, St. Louis, Saskatoon, Omaha, Winnipeg, Oklahoma, Regina, North Dakota, Kansas City, Edmonton, Minneapolis.

35 Which of the following are true? Write out those that are correct.

- Prairie farms are usually very small.
- Fields of wheat on the prairies are surrounded by hedges.
- Prairie roads are usually straight.
- Prairie fields are usually square or oblong.
- It is often calm on the Prairies.
- Prairie roads wind across the plains like snakes.
- Prairie fields are all sorts of irregular shapes.
- The wind is almost always blowing on the prairies.
- Prairie farmhouses are grouped round village greens.
- Each prairie farm has its own water supply.

36 Fig. 31 shows the wheat production of some of the chief wheat-growing countries, and the amount exported. Pick out and write down those countries that contain some of the temperate grassland. Which five countries grow most wheat? Which five export most? Why do some countries produce a great deal of wheat but export hardly any, while other countries export most of what they produce?

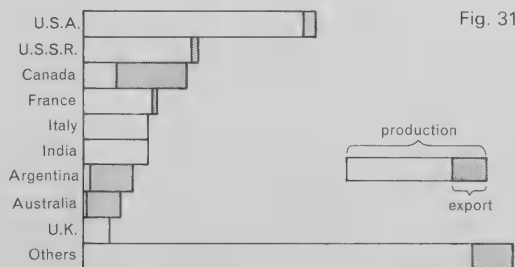


Fig. 31

37 Find the odd one out in each of the following groups and say why.

- Wheat, maize, flax, oats, barley.
- Manitoba, Saskatchewan, Illinois, Alberta.
- Calgary, Edmonton, Winnipeg, Chicago.
- Manitoba, Saskatchewan, Alberta, British Columbia.
- North Dakota, Alberta, Nebraska, Montana.
- Erie, Winnipeg, Superior, Missouri, Huron.
- Missouri, St Lawrence, Mississippi, Michigan.
- Panama, Soo, Welland, Missouri.

38 These definitions have been mixed. Write them out correctly.

- | | |
|---------------|--|
| (a) Chinook | an American buffalo. |
| (b) Blue stem | name of short prairie grass. |
| (c) Bison | warm wind from the Rockies. |
| (d) Section | a place for storing wheat. |
| (e) Marquis | a sugary syrup used in making silage. |
| (f) Buffalo | name of tall grass. |
| (g) Elevator | area of prairie 1-6 kilometres square. |
| (h) Box car | a lake wheat ship. |
| (i) Stampede | tightly pressed fodder preserved for the winter. |
| (j) Whaleback | large railway wheat truck. |
| (k) Silage | a mad rush of cattle. |
| (l) Molasses | a kind of wheat that ripens quickly. |

39 Arrange these names in correct groupings under heading of Towns, Provinces of Canada, States of U.S.A., Crops, Canals, Lakes etc. Winnipeg, Calgary, Saskatchewan, Soo, Superior, Welland, Regina, Alberta, Manitoba, St Lawrence, Mississippi, Ottawa, Flax, Panama, Vancouver, Sault Ste Marie, Huron, Erie, Halifax, Montreal, Buffalo, Churchill, Illinois, Maize, Denver, Iowa, Alfalfa, Minneapolis, St Louis, Chicago, Dakota, Missouri, Edmonton, Nebraska, Colorado, Wyoming, Montana, Omaha, Kansas, Oklahoma.

- 40 Here are the figures for world production of maize in million tons. Draw diagrams to illustrate these figures and find out the percentage of the world's maize produced in the U.S.A.

U.S.A.	121.0
Brazil	12.8
South Africa	9.6
U.S.S.R.	9.2
Argentina	8.5
Yugoslavia	7.2
Rumania	6.9
India	6.3
Others	82.1

- 41 From the following figures for temperature and rainfall at Winnipeg and St Louis, make diagrams. What is the difference between highest and lowest temperature (range of temperature) at each place? What are the main differences in their climate?

	Temperature (°C)											
	J	F	M	A	M	J	J	A	S	O	N	D
Winnipeg	-19	-17	-8	4	11	17	19	17	12	5	-4	-13
St. Louis	-1	1	6	13	19	24	26	25	21	14	6	2

	Rainfall (cm)											
	J	F	M	A	M	J	J	A	S	O	N	D
Winnipeg	2.25	2.0	3.25	4.0	5.5	8.25	8.0	5.5	4.75	3.5	2.5	2.25
St. Louis	5.75	6.5	9.0	9.0	11.25	12.0	9.25	8.75	7.5	7.0	7.5	6.5

- 42 Here is a diagram of Chicago, with arrows showing products coming in and going out. These are shown by initials only. Copy the diagram and fill in the names of the products.

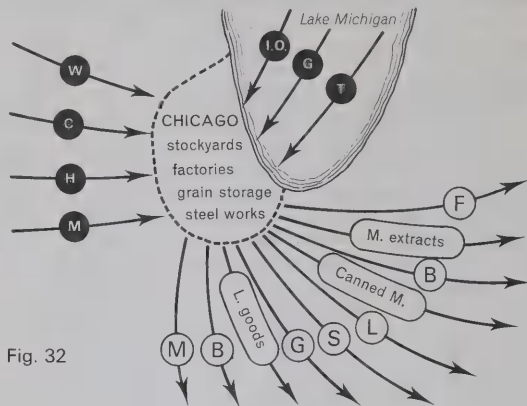


Fig. 32

- 43 Make a list of all the industries you know of connected with the growing and use of (a) wheat, (b) cattle, (c) maize, (d) hogs.
- 44 Here is a list of the largest cities or built-up areas in the prairies and Great Plains, in order of size. Draw a map of the region, and put in these towns, making the size of the dot suitable for the size of the town.

Chicago	6,670,000	Oklahoma City	325,000
St. Louis	2,259,000	Peoria	250,000
Minneapolis	1,724,000	Tulsa	250,000
Kansas City	1,238,000	Davenport	234,000
Denver	1,085,000	Des Moines	226,000
Omaha	366,000	Wichita	222,000
Fort Worth	361,000	Madison	169,000

- 45 Collect as many stamps as you can that have pictures of Canada or the U.S.A.

- 46 Here is an account of things seen from an aeroplane on a flight across part of North America. Can you suggest where the journey began, what parts of the continent were crossed, and where the journey ended?

'We start from a very large city on the shores of a great lake. Railways come into the city from all directions except from that of the lake. We fly in a straight line across level country with many dairy cattle, maize fields and animals being fattened on the farms. We come to a river with two large cities very near each other, one on each side of the river. There is much less maize being grown as we fly on, but there are fields of oats, barley and wheat instead. As we continue there are more and more wheat farms. We cross the boundary between two countries, but the countryside looks just the same—kilometre after kilometre of wheat. We turn a little to the left, and follow an important railway line through a fairly large town with big wheat elevators. At last the wheat begins to thin out, and we see many ranches with cattle and horses. A large town with many new buildings and chemical factories appears, and behind it, a line of high mountains. At this town we end our flight.'

- 47 Divide a page into squares and in each draw or stick on a cut-out picture to show the various processes in the production of a tin of corned beef. Make a list of all the processes, starting with the birth of the calves on the ranches. Don't forget the growing of the fodder to fatten them.

- 48 Here are some statements about wheat-growing areas. Write them out in two lists, one of those that are true of the spring wheat area, and one of those that are true of the winter wheat area. Some of the statements may go in both lists. Are any of the statements not true about either of the American wheat areas? If so, which are they and what wheat growing areas might they refer to?

- (a) The ground is frozen for several months.
- (b) The rainfall occurs mainly in late spring and early summer.
- (c) The rainfall is spread fairly evenly throughout the year.
- (d) The summers are very warm.
- (e) The summers are very short.
- (f) Spring comes quite suddenly.
- (g) The winter is mild.
- (h) Spring comes gradually.
- (i) Work on the land goes on all the year outdoors.
- (j) There are no frosts.
- (k) Work on the land stops for the winter.
- (l) Frost may be severe, but does not last long.

3 THE CONIFEROUS FORESTS

Their extent

When the Europeans first settled in North America, the forests supplied them with fuel and timber for their log cabins, wooden churches and protective stockades, and with game for food and furs to wear. From the forest came also dangerous wild beasts, and Indians, sometimes friendly, sometimes deadly foes. It was therefore natural for the settlers to clear the forests, not only to provide land for crops, but for their convenience and safety. Soon they began to export the best timber to Britain, and the great lumbering industry began. The taming of the 'howling wilderness' went on apace.

Little was known about the true extent of the forest, and it was not until the coming of the aeroplane that accurate information in many areas could be obtained by means of photographs. These showed how closely the trees stood, and how tall the trees were, this being calculated from the length of the shadows.

The coniferous forests stretch right across the continent of North America in an almost unbroken belt from the western tip of Alaska to the eastern tip of Newfoundland. In Alaska trees grow only in valleys and on the lower slopes of the mountains. They are smaller and

less dense than those further south, along the Pacific coast of Canada and the north-west of the United States, where there are some of the finest stands of timber in the world.

The forests extend through the valleys of the Matanuska and Yukon rivers, along the lower northern slopes of the Rocky Mountains and into the Mackenzie Valley. The northern coast of Canada is too cold and windswept for trees, but further south the tundra merges into forest, which covers much of the flat, level plains of the Canadian Shield, a vast stretch of country made of very old rock, which slopes down very gradually to the Arctic. In central Canada the trees die out in the south, into the dry prairie plains, and in the east the coniferous forest merges into mixed forest, with an increasing proportion of broad-leaved trees as one passes southwards.

On the east, the bleak coast of Labrador has scarcely any forest, except in a few sheltered river valleys. Newfoundland is almost all covered with forest of spruce and fir, with a few maple and birch in the south.

Before the coming of the white men, the forests of eastern Canada were almost uninhabited. Small scattered tribes of Indians lived by hunting and fishing in the many lakes

and rivers. Life was hard, food often scarce, and sheer starvation not uncommon.

The first white men in Canada were Frenchmen, who explored the thousands of kilometres of rivers and lakes, reaching out fearlessly into the unknown, in birch bark canoes like those of the Indians. They hunted and trapped the many fur-bearing animals that lived near the waterways. Few settled anywhere except at one or two spots along the St Lawrence river. Later British fur traders came to dispute the ownership of the land with the French, advancing southwards from Hudson Bay, and northwards from the New England colonies in what is now the U.S.A. In 1763 all Canada passed into the possession of Britain. Settlement increased, and large quantities of timber joined the shiploads of furs crossing the Atlantic to Europe.

Fur trapping

Lumbering became increasingly important, until it was by far the greatest source of trade and income. The fur trade, however, continued, and Canada today is one of the two chief producers of furs in the world. The Hudson Bay Company, established in 1670, is still the greatest fur supplying firm in the world. It has more than two hundred trading posts scattered along the rivers and on the shores of the lakes. Many of the trappers are



Fig. 33 Coniferous forests of North America.

Indians or half-breeds. In autumn they set off in their canoes, loaded with flour, bacon, sugar, tinned meat, tea and tobacco, weapons and traps, for the lonely huts which will be their headquarters for the winter. These huts are built of rough, thick logs and warmed by wooden logs burning in an iron stove. Some Indians take their family with them, and live in a tent, also heated by an iron stove.

Winter is the time for hunting, for then the animals' coats are at their finest and thickest. The snow makes it easy for the trapper to hide his snares and traps, and he can move

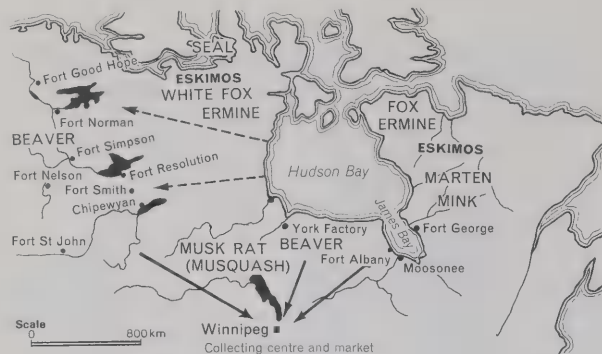


Fig. 34 The Hudson Bay Company and the fur trade.

quickly and easily along the frozen rivers and across the snow.

The animals are trapped or snared whenever possible, to avoid damaging the skins or pelts. As soon as the first snow has fallen, the hunter sets off on his snowshoes or in a dog sledge on a round of perhaps 160 kilometers, setting traps here and there, every kilometre or so. He travels along the frozen rivers, for most of the animals live along the river banks. He spends the night wrapped in his blanket, or rolled up in his sleeping bag under a rough shelter of branches. Wolves howl in the distance, and the bitter wind whistles through the trees.

Throughout the winter the hunter visits all the traps regularly, removing the trapped animals and resetting the traps. He skins the animals, cleans, stretches and dries the pelts and packs them in bundles.

The long winter passes at last, the snow melts and the ice on the rivers breaks up. The trapper loads his canoe with his pelts and snares, and paddles down the river to the trading post. There he sells his pelts, bargaining with the store keeper for guns and ammunition, tobacco, food, blankets, cloth, warm clothing and many other things. During the rest of the summer the trappers may fish for salmon in the rivers, do odd jobs round the trading post or travel south to find work on the farms. But when the autumn comes they are back once more on the way to their lonely post in the forest.

The most important animals are the silver fox, mink, beaver, marten, musk rat, ermine and otter. The pelts are sent from the trading posts to Winnipeg, the Hudson Bay Company headquarters and collecting centre, then to the great fur markets in London, Paris, and greatest of all, New York.

There are several thousand fur farms now in Canada where animals, particularly silver foxes, mink and muskrat are raised for their fur.

Trapping has been largely ended in the southern part of the Canadian forests. Animals such as beavers have been almost killed off, and the spread of lumbering has driven the trappers into less accessible regions of the forest further north.

Lumbering

Lumbering also is carried on mainly in winter, for the snow and frozen ground make it easy to transport the logs either by sledge or by chutes and slipways. A logging company will obtain permission to cut timber in a certain area, and a careful survey is made, perhaps with the help of an aeroplane, to estimate the amount of timber obtainable, and to work out the best way of transporting the logs from the area. Then a camp is established, with bunk houses for the men to sleep in, a cookhouse for preparing meals, sheds for tractors and stables if horses are to be used, offices, storehouses and repair shops.

Fig. 35

A trapper on snow shoes returns home with his catch.



Fig. 36 Silver fox.

In late autumn the lumbermen move in. They work very hard, for the time during which the felling and transport can be done is barely four months, and the hours of daylight are few. The men get up and breakfast before dawn. Each tree to be felled has a deep notch cut by axe on the side towards which it is to fall, and then with a large double-headed saw the trunk is cut through from the other side. When the tree is about to fall, a loud shout of 'Timber!' warns the other workmen near, and the tree comes crashing down. The branches are lopped off with the axe, and the trunk is then sawn into logs.





Fig. 37 Tree felling

The logs are dragged over the frozen ground to ice roads, built up by sprinkling water over the trackway. The ice roads or chutes direct the logs to a central dump, from which they are loaded on to sledges and dragged by tractors to the nearest river or to slipways leading to it. Sometimes the logs are hauled to the central dump by steel wires attached to a steam engine.

A team of three men can fell dozens of trees a day. They return to camp at sundown, and eat a huge meal, after which they sit round fires smoking, play cards or read books from the camp library.

The logs are piled up on the frozen rivers, waiting for the spring thaw. Felling stops then, and many of the lumbermen move to the farmland where once more they are engaged in a race with time, ploughing, sowing and harvesting before the short growing and ripening season ends.

Meanwhile the logs, often covering the whole river from bank to bank, are carried downstream to the sawmills. The rivers are swollen with melting snows, and where they pass over rapids or through narrow places, they become raging torrents, tossing the great logs like matchsticks, and piling them up in great jams. Skilled men with spiked boots and long pike poles leap from log to log and guide the logs, trying to prevent them from jamming, using sticks of dynamite to move the 'key' logs that are causing the jam. It is important to get all the logs moving, so that they may all reach the sawmills before the level of the rivers falls when the snow is all gone. Sometimes dams are built on small streams, to raise the level of the water; the logs are floated to the dam and then guided through a narrow chute down which they glide to the next level of the stream below. On bigger, slow flowing rivers and on lakes, thousands of logs are made into huge rafts on which the men build several huts in which to live as they float slowly along, then when they come to rapids the rafts are broken up again.



Fig. 38

A log jam.
What do you think has
just been done here?



Fig. 39

Logging rafts in Vancouver Harbour.
Down what rivers may these logs
have been floated?

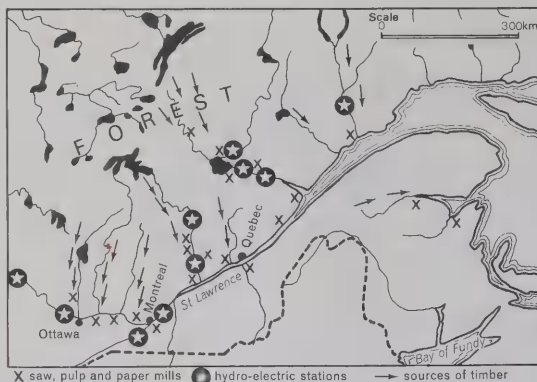


Fig. 40 The forestry industry of north-east Canada.

At last they reach the sawmills which are usually set up where the stream meets the main river, and near rapids or a waterfall so that cheap electric power can be generated. This drives the machinery and provides light and heat for the workers and for towns and villages nearby.

All along the river St Lawrence, rivers enter from the forests to the north, and vast quantities of timber are dealt with in hundreds of mills. The province of Quebec is the main centre of the industry. The mills in this area are fortunate in being near to a vast supply of good timber, which can be floated cheaply from the forest to the mill, in having a plentiful source of cheap electricity, plenty of clean fresh water and in being situated on navigable water so that such raw materials as are needed

can be cheaply imported and finished products can be easily exported.

The trees of the Quebec forests are mainly spruce, balsam, fir, hemlock and jack pine, but spruce is far more important than all the others put together.

In the sawmills the logs are cut by circular saws into planks, and stored in huge stacks in such a way that air can circulate freely through them to dry them. Some mills also cut, plane and manufacture the timber into standard-size doors, window frames and other house fittings.

The bulk of the timber from this part of Canada, however, is not used as wood at all, but is pulped for making into paper. More than half the newspapers of the world are made from Canadian pulp. The wood for pulping is treated in various ways. To make the cheapest paper, the logs are pressed in machines which spin two hundred times a minute, and reduce the wood to shreds. These are then mixed and ground in a wet state, and then passed between heavy rollers. Better quality newsprint is made by slicing the logs, and then boiling the fragments with strong chemicals.

The paper mills are huge concerns with very costly plant, and it is therefore important to ensure that the supply of timber within reasonable distance is not used up, and paper mills now plant hundreds of thousands of new trees every year to replace those cut down, and so

they have a constant supply of timber of the size they require.

In Newfoundland there are large paper mills. The strong winds and low temperature prevent the trees from growing to any great size, and they are more suitable for pulping than for making into timber. For many years fish was the most valuable product of the island, but now forest products have become more valuable.

One of the most important jobs in the forest lands is that of forest ranger. Terrible fires sometimes sweep across the forest, destroying

millions of trees. One fire in 1933 destroyed all the trees in 973 square kilometres. It is the work of the forest rangers to prevent fires or to take steps to stop fires from spreading. Large numbers of tall steel observation towers have been erected. These are equipped with telephones and wireless, and immediately a fire is spotted, the ranger sends messages to the camps where large aircraft are kept in readiness with fire fighting apparatus and crews. Light aeroplanes frequently patrol the forest, and these can also notify the fire fighting services by radio.

Fig. 41

A log pile.

Logs being piled at Fort William, Ontario.
What is happening to the logs
on the right of the picture?



The Maritime Provinces

The forests extend to the south of the St Lawrence river and when the Europeans first came to this area almost the whole of the Maritime provinces were covered with trees, mainly spruce and pine, with a good many maples, birch and beech. Most of the forest is still there, for the uneven ground, poor soil and short growing season do not make farming easy or prosperous, and it has not paid to clear the forest except in a few areas. In New Brunswick forest still covers nearly nine tenths of the land, but some of the lower land has been cleared and there is some farming, the main crops being fodder, vegetables and small fruits. There is some dairy farming.

In the Annapolis valley in Nova Scotia there are huge apple orchards covering the slopes. In spring the cold frosty air which would destroy the blossom flows downhill at night

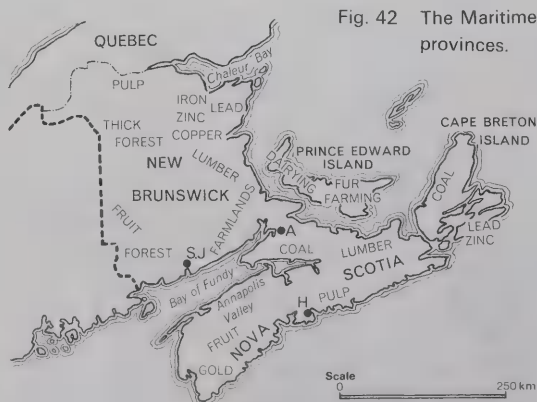
and collects in the valley at the foot, leaving the sloping orchards free of frost.

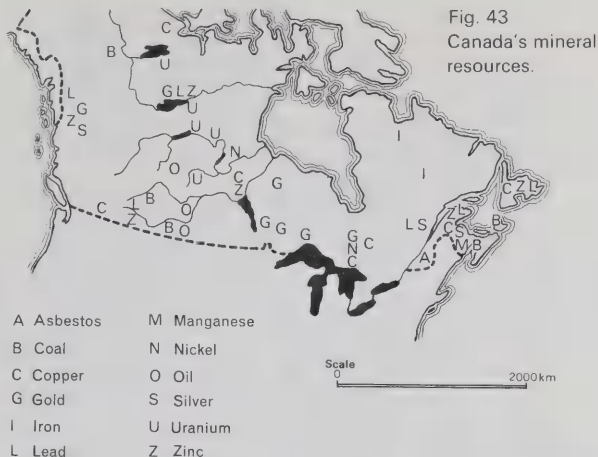
Prince Edward Island is famous for its fox farming which was started in 1894, and has since spread to many other parts of the world. The farms provide work in the winter, when little ordinary farming work can be done. Mink, marten and racoon are also reared.

The Bay of Fundy and the east coast of Nova Scotia are ice-free in winter, while Montreal and the St Lawrence are frozen for several months, and so much of Canada's winter trade passes through St John and Halifax.

Minerals

Since the early days of trapping and lumbering, another industry has become important in the forested areas of Canada: the extraction of minerals. Most of the minerals are found in the rock below the forest, and probably there are many more mineral deposits still hidden and unknown. New knowledge is being constantly gained: canoes follow the thousands of streams, aeroplanes fly from lake to lake, helicopters land in small clearings in the forest. The glaciers that covered this part of Canada thousands of years ago scraped most of the surface soil away, and laid bare the mineral-bearing rock, which is thus easier to find.





When mineral deposits worth working are found, a camp is set up. For a time life is very hard, until the camp is turned into a town. Sudbury, now the great centre of the world's largest nickel and copper mining area, grew in this way. At first the forest supplied the fuel to produce the power for operating the mines, but now hydro-electricity is generally used.

Canada is the world's greatest producer of nickel, platinum and asbestos. Among other minerals, gold, silver, copper, uranium, radium, aluminium, magnesium and lead are mined in considerable quantities. More than half Canada's gold, half her copper and nearly all her nickel comes from Ontario.

Fig. 44

Sudbury; nickel mining and refining.
Most of the people of Sudbury
work at mining and metallurgy
and earn very high wages.



Nickel is a most important mineral, for when small quantities are mixed with steel, the resulting metal is much tougher and more resistant than ordinary steel; so nickel is being used in ever increasing quantities.

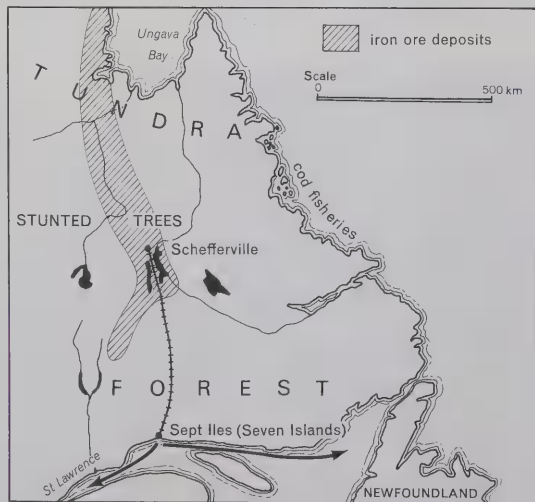
Uranium is used for producing atomic energy, both for nuclear bombs and for peaceful purposes. It is obtained from a mineral called pitchblende, which was discovered to exist in large quantities in northern Canada in 1930. From a mine 400 metres deep, the ore is brought to the surface and some of

the impurities are removed. It then goes by steamer and barge on lake and river nearly 2,400 kilometres to the railway in Alberta, and then by rail nearly 3,200 kilometres to be refined on the shores of Lake Ontario. Most of the uranium then goes to the U.S.A.

Radium also is obtained from pitchblende in exceedingly small quantities—the richest ore produces about 28 grams of radium from each hundred tons of ore, and some ores produce little more than a quarter of a gram from a hundred tons.

Canada is one of the world's largest producers of gold, although she comes a very long way behind South Africa, and possibly behind the U.S.S.R., whose production is not known. Most of Canada's gold comes from various parts of the Canadian Shield. Rich iron ore is produced on the northern edge of the forests of Labrador. This is a desolate area, and so difficult to get at that at first all materials, equipment such as bulldozers, food and men had to be taken several hundred kilometres by air. Meanwhile a railway was being constructed, but the country was so difficult that it cost nearly £26,000 for every kilometre. Now the ore comes the 560 kilometres from the mines by rail to the docks at Seven Islands on the St Lawrence. Then it goes by the St Lawrence Seaway to the big steel works near the Great Lakes or by sea to the east coast of the U.S.A.

Fig. 45 The Labrador iron-ore field.



Cities of the St Lawrence

The St Lawrence and its tributary, the Ottawa river, have always provided the main routes into the heart of the continent, although they are frozen over for three months. Nearly all the large towns of this part of Canada are on or near these river routes. Ocean-going vessels sailed sixteen hundred kilometres up the St Lawrence to Montreal, by far the largest Canadian port. After that special river steamers continued up the river and across the Great Lakes, avoiding the Niagara Falls and various rapids by canals. In 1959 the St Lawrence Seaway was opened, making it possible for large ocean-going vessels to make the whole voyage of 3,680 kilometres from the mouth of the St Lawrence to the head of Lake Superior. Its construction cost several hundred million pounds.

Montreal, with two and a half million inhabitants, is the largest city in Canada. It stands at the meeting place of several important routes, and has many manufactures. There are about five thousand factories in and around the city, for raw materials can easily be brought in from all directions, and cheap electric power is obtained from generating stations on the rapids just above the city. There are good docks for moderate sized ocean-going vessels. Most of the people of Montreal are descended from the original French settlers of over two hundred years ago. French is still the chief

Fig. 46

The position of Montreal.



language; in fact Montreal is the second largest French-speaking city in the world.

Quebec is even more French than Montreal. It was the capital of Canada when the country was part of the French Empire, and it is now capital of the province of Quebec. It is the only North American city with protecting walls like those of the old cities of Europe. It has many interesting old buildings. It is now a city of over 400,000, with many factories. There are large modern docks at which some of the biggest ocean liners, which cannot reach Montreal, finish their voyage across the Atlantic.

In the south and east of Quebec province maple sugar is produced. The maple sugar trees are first tapped when they are about forty years old, and then they give an increasing yield for the next forty years or so. Just over a metre from the ground a hole is bored about five centimetres deep into the trunk. A



Fig. 47

Tapping maple trees.
What is the man in the
foreground doing?
What has previously been
done to the tree?

spout is driven into the hole and a hook is fixed to it. A bucket is hung on the hook and the sap collects in it. The tapping usually begins at the end of February, when the winter is beginning to break, but while there is still snow on the ground. A large tub is driven through the forest on a sledge to collect the sap from the buckets. The sap is boiled to drive off the water, and so turned into maple syrup, or, after further boiling, into maple sugar.

Ottawa, about the same size as Quebec, is roughly between the English and the French speaking parts of Canada, and is the capital.

It is the centre of a great lumber and pulp industry.

Almost surrounded by Lakes Ontario, Erie and Huron is an area known as the Lake Peninsula. Here is some of the finest country in Canada for mixed farming. Many dairy cattle are reared and large quantities of cheese are made, in fact Canada is the greatest exporter of cheese in the world, most of it going to Britain. Much fruit is grown, not only apples, but Mediterranean fruits such as peaches, apricots and grapes. This part of Canada reaches almost as far south as the latitude of Rome.

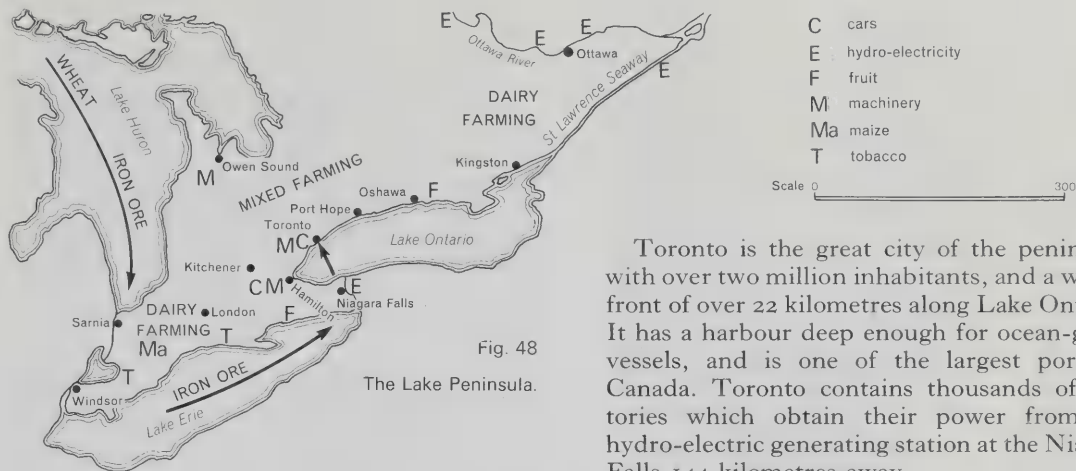


Fig. 48

The Lake Peninsula.

Toronto is the great city of the peninsula, with over two million inhabitants, and a waterfront of over 22 kilometres along Lake Ontario. It has a harbour deep enough for ocean-going vessels, and is one of the largest ports in Canada. Toronto contains thousands of factories which obtain their power from the hydro-electric generating station at the Niagara Falls 144 kilometres away.



Fig. 49 Toronto.

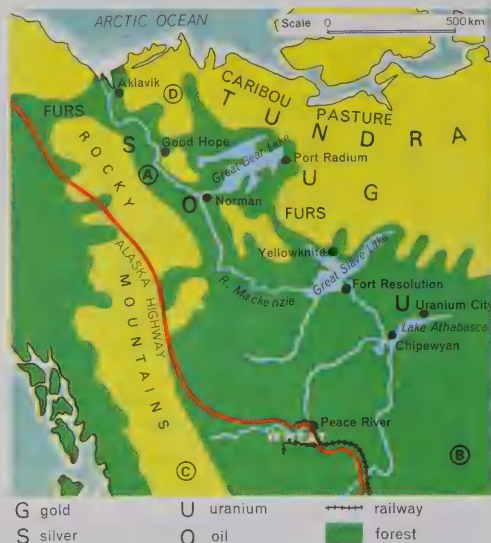


Fig. 50 The north-west. Why is there forest at A and B but not at C and D?

basin much earlier than in the north, with the result that ice jams occur, and the land near the river becomes flooded or marshy.

The southern part of the Mackenzie basin in northern Alberta has been found suitable for wheat growing and cattle rearing. Several railways connect this area with Edmonton and the main Canadian trans-continental lines. Steamers sail the Peace and Athabasca rivers regularly during the summer months.

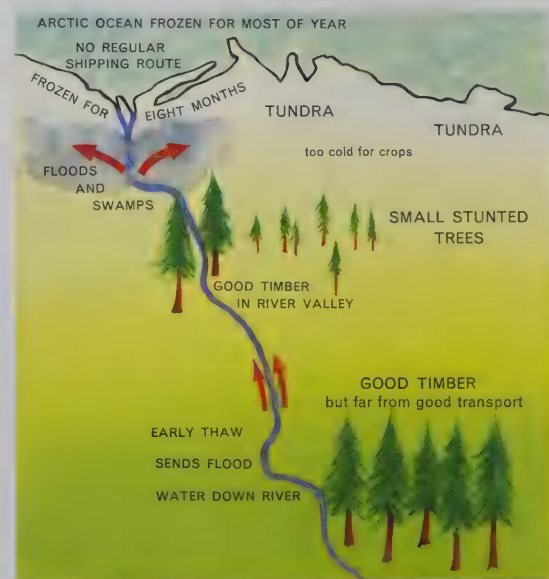


Fig. 51 Drawbacks of the Mackenzie river.

The North-west

The forests cover much of the Mackenzie and Yukon basins, but little use is made of the timber. Except on the lowland near the rivers, the trees are usually small, and of little use except for pulp. The main drawback to lumbering here, however, is the difficulty of transport. The Mackenzie is one of the world's really great rivers, but it flows the wrong way—it flows northwards into the Arctic Ocean which is frozen for much of the year. The river is frozen throughout the long winter, and the thaw occurs in the southern part of the

North of latitude 60°N. the main products are furs and minerals. The gold rush of the Klondike at the end of the last century has long passed away. In 1900 the Yukon had a population of 27,000, but fifty years later it had dwindled to 9,000, and silver and lead had become more important than gold.

The construction of the Alaska Highway, a motor road 2,560 kilometres long from Edmonton through north-western Canada to Fairbanks in Alaska, and of the Mackenzie Highway penetrating 640 kilometres to Great Slave Lake, has made it much easier to open up these areas. A chain of airfields extends along these roads, and aircraft are used extensively to reach mining districts away from the roads. Floatplanes use the lakes and rivers, alighting on the water in summer and changing their floats for skis to land on the ice in winter. Thousands of tons of supplies and equipment are carried in this way. In winter large snow-tractors haul heavy loads of men and goods on sledges, finding their way at night by means of powerful searchlights.

Gold, silver, copper and uranium are mined near Great Bear Lake, and much of the ore is transported from the area during the summer in barges on the lakes and rivers to the railhead far to the south at McMurray. There are oil wells at Norman, and the oil is refined on the spot to supply the mines, aircraft and boats with petrol.



Fig. 52 The Alaskan Highway.

New towns such as Uranium City are being built, and for the first time such things as schools and hospitals are being provided in these remote regions. Life is still very hard, however; the winters are very long, cold and dark, and for months the temperature remains far below freezing point, sometimes reaching

—50°C. There is scarcely any daylight, and most people have to stay indoors almost all the time. The summers are short and hot and there is scarcely any night. Plagues of flies and mosquitoes, which are quite as numerous on the Arctic Circle as they are in the tropics, make life almost unbearable. The prosperity of such towns as Uranium City is very precarious. In 1959 Uranium came fourth in value of all Canada's exports (after wheat, newsprint and timber), but soon afterwards sources of supply were found in other countries and now the demand for Canadian uranium has been much reduced. It is difficult in such out of the way places as Uranium City to find alternative industries.

The Indians, and Eskimos on the northern edge of the forest are now increasing in numbers, and they are sometimes hard put to it to find enough food. Fishing has been developed in the lakes, and reindeer have been brought from the western side of Alaska. For five years herdsmen drove a great herd on the long slow 1,900 kilometre journey to the eastern side of the Mackenzie delta. Now many of the people who have always lived by hunting are becoming reindeer herdsmen instead. Here, too, Europeans have forced nature to produce more and different foods, and have changed the way of life of the native peoples.

Things To Do

- 49 Draw a map of North America north of latitude 40°N. showing the boundaries of countries and provinces, and shading or colouring the coniferous forests.
- 50 Draw a map of North America north of latitude 40°N., and show rivers and towns. Shade the coniferous forests.
- 51 Canada is one of the two chief fur producing countries in the world. Which would you expect to be the other?
- 52 Draw a series of pictures of a trapper's life.
- 53 Draw a map of the Maritime provinces and show the province boundaries and names. Name the chief features and show things mentioned in this section.
- 54 Here are the graphs for the temperature and rainfall in the Canadian coniferous forest and the forest of the Amazon. Which is which? Write a sentence about each and the effect of the climate upon the type of trees in the forest.

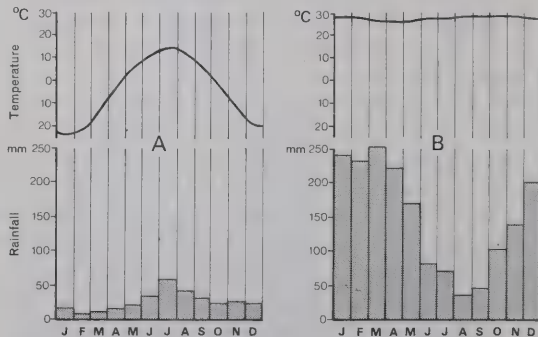


Fig. 53

55 Draw a map to show the Canadian National Railway and show the coniferous forest and towns on or near the route.

56 Here is an account of what was seen from an aeroplane on a flight over the Canadian coniferous forest region, from the mouth of one great river to the mouth of another. Can you say which are the rivers? Make a list of the various towns, rivers, lakes etc. mentioned, and make a sketch map of the flight.

'We flew inland along a wide river mouth which had forest on both sides. At first most of the trees were pines, spruce and birch, but as we flew on for hundreds of kilometres we saw more broad leaved trees, especially on our left. We passed over a large city on the left bank of the river (on our right), its roofs glittering with snow, for it was February, and the river was frozen over. Presently the river divided into two or three channels and an even larger city appeared, built on one of the islands made by the divided river. Presently we turned to the right and followed a tributary of the main river. Many logs were piled up on the ice waiting for the spring thaw. We came to an important city with many pulp mills. We continued along the river, and when we flew very high we could just see a huge lake far away to the left.

After another 1,100 kilometres we noticed that the land sloped gradually away to the right. The trees were smaller and grew less thickly together. Far away to the right we could see a stretch of frozen sea. After another 1,280 kilometres over country covered with forest and thickly scattered with lakes, we came to a wide, shallow river valley, and turned slightly to the right to fly along it. To the right of the river stretched a lake some 320 kilometres long. The lake was frozen, but work was going on at a mining town on the north bank. We followed our river for another 320 kilometres and came to a great lake, 800 kilometres further on we could see another

great lake to the right, with a mining town at the far end. We flew on over pine forests of small trees. As the forests began to die out, we reached the frozen sea at the mouth of the river.'

57 In which of the following places would you expect to find coniferous forests?

(a) Lat. 50°N Long. 110°W	(g) Lat. 45°N Long. 75°W
(b) " 55°N " 110°W	(h) " 70°N " 120°W
(c) " 60°N " 110°W	(i) " 60°N " 120°W
(d) " 65°N " 110°W	(j) " 50°N " 120°W
(e) " 60°N " 75°W	(k) " 40°N " 120°W
(f) " 50°N " 75°W	(l) " 38°N " 120°W

58 Draw a picture of lumbermen at work.

59 Draw a picture of a forest fire.

60 Draw a map of the waterway from lake Superior to the sea, putting in towns, products and occupations near by.

61 Draw a map of the Mackenzie river basin. Show high and low land, towns and occupations.

62 Where and what are these places in North America?

- (a) A Canadian town on a delta in the Arctic.
- (b) A Canadian bay in about the latitude of London which is frozen for several months.
- (c) A large city on the northern shore of the fifth large lake through which a river flows on its way to the sea.
- (d) A city at the confluence of the St Lawrence and its largest tributary.
- (e) A lake on the Arctic Circle, almost completely surrounded by coniferous forest.

4 THE PACIFIC COASTS

Lumbering

The climate of the Pacific coast is very different from that of the rest of the forest belt. Mild westerly winds bring plenty of rain, and keep the coastal districts free from ice. There is little level lowland, and the slopes of the mountains are covered with coniferous forests. Many of the trees are magnificent giants, over 60 metres in height. They provide excellent timber, so lumbering has become one of the most important industries of British Columbia, and of the north-western states of the U.S.A. More than half the timber produced in North America now comes from the Pacific coast regions.

The forest extends much further southwards along the mountains in Oregon, Washington and California and even larger trees are found, particularly the giant redwoods, some of them over 90 metres high and 5 metres in diameter. Some of these giants were mighty trees when Julius Caesar invaded Britain over two thousand years ago; they are the largest and the oldest living things in the world. Many of the tallest trees have their tops cut off first so that they will not do so much damage when they fall.

The Douglas fir is by far the most important tree for timber, and it is exported all over the

world. It is used for all sorts of timber structures, for flooring, doors and window frames, piles and plywood. Other useful trees are Sitka spruce, which is tough and easy to work, hemlock, a very straight-grained wood, and red cedar, which splits easily and resists

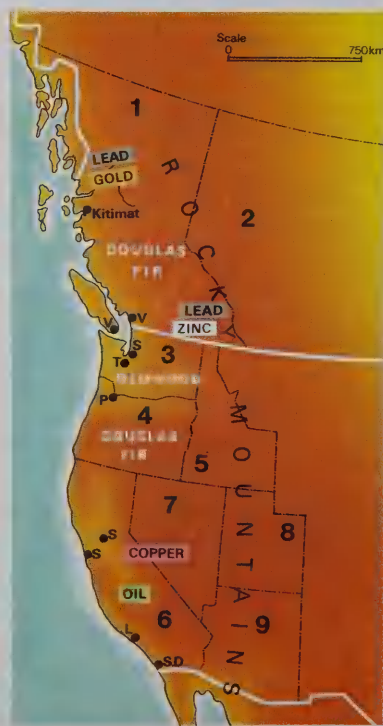


Fig. 54 The Pacific coast.
Copy the map and name the nine states shown,
and the towns indicated by initials.

decay, and is therefore used for shingling, fencing and telegraph poles.

Cutting on the Pacific coast is carried on all the year round, for there is no season of hard frost, when it is easy to slide the logs over the ice roads. Logging is highly mechanised, and the big logs are handled by huge diesel-powered tractors or carried on logging railways. Sometimes wooden channels called flumes are made, and the logs are floated down singly. In some cases no water is used, and the channels become so smooth that the logs shoot down them at a speed of 48 kilometres an hour.

In British Columbia 'sky lines' are used. Two very tall strong trees several hundred metres apart are linked by a strong cable high above the ground. A travelling carriage runs along this cable, and a steel rope from it is fastened to one end of the logs, and they are dragged along. A series of these sky lines forms the cheapest method of moving large logs from mountainous areas.

The rivers are usually too rocky and rapid to float the logs, and the chutes and sky lines take the logs straight down to the shores of the long inlets of the sea, of which there are many in British Columbia. Most of the lumbering is therefore carried on as near the sea as possible. The timber is exported across the Pacific, and large quantities pass through the Panama Canal on the way to eastern U.S.A. and to Europe.



Fig. 55 Giant redwood trees.

At first the forests seemed unlimited, and the lumbermen cleared hectare after hectare, always moving on to fresh districts as old ones were left bare of trees. But men found that a forest was not just a collection of trees—it was something much more complicated. The forest

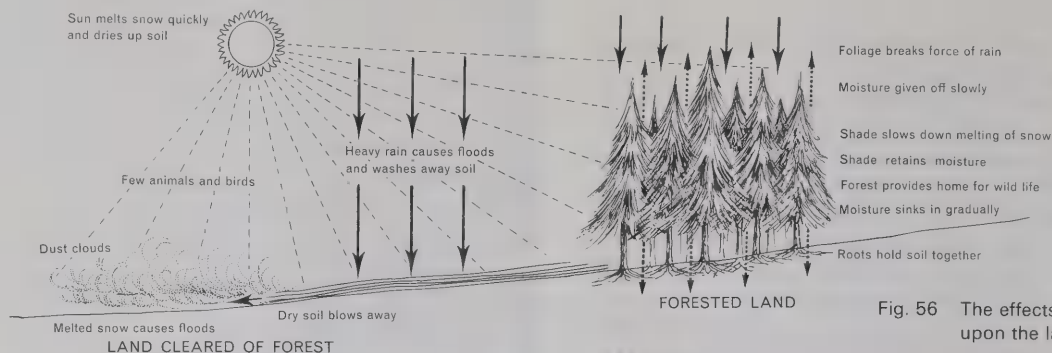


Fig. 56 The effects of forest upon the land.

Minerals

protected the soil from the heavy rain that fell on the Pacific coast, it absorbed a great deal of the moisture, it slowed down the melting of the snow on the mountainsides in spring, as well as providing food and homes for many wild animals and birds. When large areas of forest were cleared, the unchecked rain or rapidly melting snow poured across the open ground in torrents, washing away the fertile soil and scouring deep gullies. Wild life disappeared, and the land became desolate. In 1905 the U.S. Forest Service was started, and now, for every tree cut down, another is planted, and hillsides are not completely cleared of trees. Thus new forests will always be growing up to replace those cut down, and America will continue to supply the vast quantities of timber that the modern world requires.

As in eastern and northern Canada, many of the forested ranges of the western mountains are rich in minerals. Gold was found in the mountains of British Columbia in 1858, and this was one of the reasons for the construction of the Canadian Pacific Railway, to link up the mineral bearing region with the more closely settled east. Copper, lead, zinc, silver and mercury are mined and smelted and refined by the use of hydro-electric power. Huge dams have been built at Grand Coulee, Bonneville and other places, and the cheap electric power has led to a great increase in smelting, ores now being carried thousands of kilometres to be dealt with at Tacoma, Trail, Longview, Kitimat and other places.

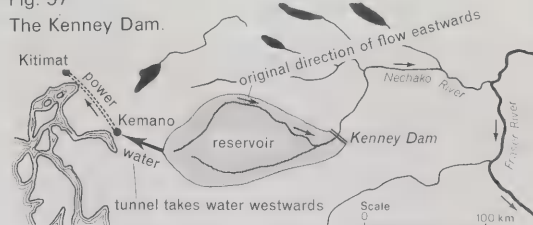
Many aircraft were built on the west coast of America during and after the Second World War, and there was a great demand for

aluminium. Ore called bauxite is brought from Jamaica by sea via the Panama Canal to Kitimat and by rail from the Gulf of Mexico coast to smelting areas in north-west U.S.A.

To supply Kitimat with cheap power the eastward-flowing Nechako river was turned into a vast artificial lake, 192 kilometres long, by the Kenney Dam. A tunnel 16 kilometres long was driven through the western end of the lake down to Kemano, 800 metres below. It thus reversed the flow of the water which formerly joined the Fraser, and carried it to the Pacific side of the mountains to Kemano where one of the world's biggest power stations produces over two million horse power. From Kemano the electricity is carried by cable to Kitimat, which is situated on a deep inlet of the sea. Here the ore arrives for smelting, and the pure aluminium is then sent off again some thousands of kilometres to the factories.

At Trail in British Columbia there is one of the largest smelting works in the world for metals other than iron. In the early days the sulphur fumes drifted down the valley of the Columbia river into United States territory, making the soil acid and infertile, and killing the leaves of the trees, and thus increasing the damage by fire. An international court ordered the mining company to reduce the amount of sulphur in the fumes and to pay £100,000 in compensation for the damage done.

Fig. 57
The Kenney Dam.

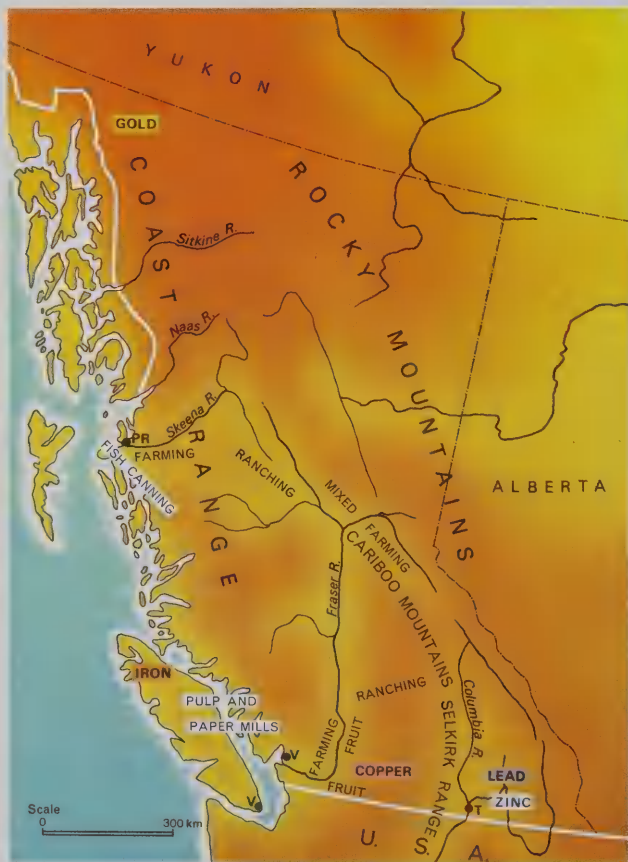


There are several coalfields in British Columbia, but they have not been developed very fully, partly because so many ships now burn oil, and partly because electricity can be produced cheaply and in huge quantities from the mountain rivers.

Farming

The amount of lowland near the Pacific coast suitable for farming is very small. In some of the river valleys, particularly the Willamette, where the natural grassland was used by the first settlers to grow grain, there are important farming areas. In the middle of the nineteenth century there was a gold rush to California, and the farmers were encouraged to grow more food. When the railways reached the Pacific coast in the 1870s and 1880s, new settlers arrived, and they began clearing the forested slopes. The huge size of many of the trees and the difficulty of getting rid of the great stumps discouraged them, and most of

Fig. 58 British Columbia. Copy the map and name the towns whose positions are shown by initials.



the slopes are still forested. Grain growing decreased and dairying spread over most of the valley floors, while fruit growing—apples, plums, cherries, strawberries and raspberries—became important. Hops, bulbs and peas and other vegetables are also widely grown. Large quantities of canned peas and hundreds of carloads of bulbs are sent to the eastern U.S.A.

In British Columbia the main farming regions are in the lower Fraser valley and on Vancouver Island. There is mixed farming, dairying and fruit growing, particularly apples on the slopes, while small fruits and vegetables are grown on the lowland. Many bulbs are grown to be sold in eastern Canada. Further inland are dry sheltered valleys where apples, plums, pears and peaches are grown.

Salmon fishing

The north Pacific coast is one of the great fishing regions of the world. Most important are the salmon, but increasing quantities of halibut, cod and herring are being caught.

The salmon is a most remarkable fish. The eggs are laid in the gravel of the beds of mountain streams. They hatch into small fish which soon begin to make their way downstream towards the sea. When they reach it they leave the fresh water and swim off into the open ocean where they live for two or

three years, until a mysterious urge comes over them to return to the stream where they were born. Huge numbers of them come crowding to the shore in early summer, seeking the river in which they were hatched. Very few enter the wrong river. By this time they are fine large fish, weighing anything up to 45 kilograms, and they shoulder one another aside as they struggle to enter the river mouths in millions. Some are forced out of the river on to the banks, but they leap in again and continue their frantic journey, without stopping for rest or food. With amazing strength they leap up waterfalls and rapids, until at last they reach their 'home' stream, far up in the mountains. There the female digs a nest or redd in the sand and shingle and lays a large number of eggs. These she covers with shingle and then leaves to hatch. The parent fish are now weak and thin, and they float helplessly down the stream. Birds of prey and gulls tear at them, bears come down from the forest and scoop the dying fish from the water with their paws. Many dead fish are washed up on the banks, where they smell horrible as they rot.

The small fish coming downstream to the sea, and the parent fish after spawning are of no use to the fishermen, but when the salmon come swarming in from the open sea, large, plump and healthy, there is a vast harvest very easy to gather.

Before the coming of the white man to these

regions, the Indians of the Pacific coast lived very largely on salmon, eating them fresh in the season and smoking or salting them for winter and early spring. In 1834 white men began preserving salmon there, and in 1866 salmon were canned for the first time. Now there is a vast canning industry worth millions of pounds.

The salmon are caught mainly in gill nets, seine nets or traps. Gill nets are stretched across the river mouth, and the fish are caught by the gills. Another type of net is taken out by boat, one end is dropped, and the boat then passes round the school of salmon, paying out the net bit by bit until it completely surrounds the salmon. The net, which is kept upright in the water by floats and weights, is then gradually drawn together into a small circle, and the bottom closed, so that the salmon are completely trapped and the net can then be emptied.

Traps are set in deep river mouths. Piles are driven into the bed of the river in the shape of a V, and wire netting is stretched between them so that the salmon are forced towards the centre where there is a movable net which can be raised as soon as the fish are in it. Sometimes, instead of the large movable net, the trap leads by a narrow opening into another enclosure from which there is no way out, and the mass of struggling fish can be easily lifted out in large nets.



Fig. 59

Seine nets being pulled
aboard a fishing boat
off San Juan,
British Columbia.
How are these nets used?

As soon as they are caught the salmon are hurried to the cannery to be cleaned, prepared and cut up. Much of this work used to be done by Chinese labourers, but now it is nearly all done by a machine. First a stream of water plays on to the fish, cleaning off slime and dirt. The jet of water forces the fish on to a moving belt which takes them to the machine which seizes the fish one by one, cuts off the

head, tail and fins, cuts them open, removes the entrails and scales and then passes them along the moving belt where they are again washed and inspected before passing through a series of revolving knives which slice them up into cutlets. Other machines place the cutlets in the cans, salt them and seal them and pass them on to be cooked, labelled and packed.

Meanwhile the machine has passed the uneatable parts on to another moving belt. Some of this may be dumped in the sea, but nearly all of it has some use: oil rich in vitamin D is obtained from the liver; other oils are used for soap or paint-making; fertilisers and feeding stuffs for poultry and stock are made from the waste.

Hundreds of millions of tins of salmon leave this district for other parts of the world every year. Such huge numbers of salmon were taken that the supply of fish began to fail. The construction of dams to generate electricity or to provide water for irrigation also cut off many salmon from their breeding waters, and something had to be done to save the industry. Agreements were made to allow a certain number of fish to pass through the nets and traps and up the rivers. Special spawning grounds were stocked with young salmon and protected. To get past the dams such as that at Bonneville, a fish 'ladder' was constructed: a certain amount of water passes from the reservoir above to the river below by a series of steps over which the water cascades, and up which the salmon easily pass.

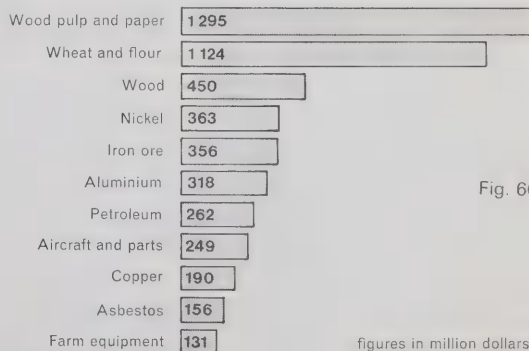
There are many canneries beside the deep water openings along the Pacific coast. They thus have sheltered landing stages, are near the scene of the taking of the fish, have plenty of pure fresh water from the rivers, and are well placed for despatching the canned fish.

Things To Do

- 63** The meanings of these words have been mixed. Write them out correctly.

- | | |
|---------------|---|
| (a) Deciduous | A tree that has needle leaves. |
| (b) Cone | A channel to carry logs. |
| (c) Sitka | The largest kind of tree in the world. |
| (d) Conifer | A tree that loses its leaves in autumn. |
| (e) Softwood | A name given to the wood of broad-leaved trees. |
| (f) Larch | A tree that gives sugar. |
| (g) Flume | The seedcase of a pine tree. |
| (h) Hardwood | A name given to wood of coniferous trees. |
| (i) Maple | A deciduous coniferous tree. |
| (j) Redwood | A kind of spruce tree. |

- 64** Here are the figures for the value of exports from Canada recently. Make a graph of them and write a sentence or two about Canada's exports and the regions from which they are obtained.



- 65** Here are the latitude and longitude of several places in the coniferous forests of North America. All the latitudes are north of the equator and all the longitudes are west of Greenwich. What are the names of the places? They may be hill slopes, towns, lakes etc. Say what types of trees are likely to be growing there, and what use is likely to be made of the trees if any.

(a) Lat. 45°12'	Long. 75°52'	(f) Lat. 54°0'	Long. 123°0'
(b) " 47°20'	" 53°6'	(g) " 40°0'	" 123°0'
(c) " 45°30'	" 122°55'	(h) " 49°0'	" 70°0'
(d) " 58°40'	" 94°0'	(i) " 55°25'	" 60°30'
(e) " 66°10'	" 117°40'	(j) " 67°0'	" 120°0'

- 66** These meanings have been mixed. Write them out correctly.

(a) Redd	The skin of a fur-bearing animal.
(b) Tundra	An animal found in the coniferous forest.
(c) Pelt	A salmon's nest.
(d) Bauxite	A metal which Canada produces in greater quantities than any other country.
(e) Nickel	Ore from which uranium is obtained.
(f) Marten	A region where gold was found.
(g) Pitchblende	Ore from which aluminium is obtained.
(h) Willamette	An opening of the sea in eastern Canada.
(i) Klondike	A river valley in western North America where farming is important.
(j) Fundy	The name of the district north of the coniferous forest.

- 67** How far does a log from the Pacific coast of British Columbia travel if it is taken via the Panama Canal to London?

- 58** Some of these statements are true and others are not. Write out those that are true.

- (a) Ottawa is the capital of Canada.
- (b) Montreal is much bigger than Ottawa.
- (c) Toronto is the largest city in Canada south of lat. 45°N.
- (d) Ottawa is further north than Montreal.
- (e) The Canadian Shield slopes gradually down towards the south.
- (f) There is very little lumbering on the coast of Labrador.
- (g) The trees of eastern Canada are cut mainly for timber, those of the west for pulp.
- (h) Giant redwoods grow mainly in California.
- (i) It is more frosty at the bottom of the Annapolis valley than it is on the slopes.
- (j) In January ships sail to Halifax instead of Montreal.
- (k) Canada produces less gold than the U.S.A.
- (l) The whole of the Lake Peninsula is further south than any part of Britain.
- (m) No wheat can be grown in the Mackenzie basin.

- 69** These meanings have been mixed. Write them out correctly.

(a) Matanuska	A river valley in Nova Scotia famous for apples
(b) Seven Islands	Where there are silver fox farms.
(c) Kitimat	A great power station in western U.S.A.
(d) Montreal	The biggest nickel smelting centre in the world.
(e) Annapolis	A river valley in the north-west of North America.
(f) Sudbury	The largest city in the Lake Peninsula.
(g) Prince Edward Island	The port at the end of the rail from the Labrador Ironfields.
(h) Toronto	The largest city in Canada.
(i) Kemano	A large aluminium smelting centre in Canada
(j) Grand Coulee	A great power station in north-western Canada.

70 Make a large wall map of North America north of latitude 40°N and stick or draw pictures to represent the people, the countryside and the products.

71 Draw a map of the Pacific coast of North America north of latitude 40°N. and show the boundaries of provinces or states, the inlets of the sea and the ports.

72 Imagine you have made a journey along latitude 50°N from longitude 55°W to longitude 125°W. Describe the country through which you passed, whether flat, hilly or mountainous. Say what sorts of plants are growing (forest, grass, etc.), crops raised and the occupations of the people.

73 Describe a similar journey along longitude 120°W. from latitude 70°N. to latitude 40°N.

74 The following meanings have been mixed. Write them out correctly.

- | | |
|----------------|--|
| (a) Fraser | A town on the railway from Edmonton to Northern Alberta. |
| (b) Ottawa | A large city on the river St Lawrence. |
| (c) Quebec | The capital of Canada. |
| (d) Fairbanks | A great smelting centre in British Columbia. |
| (e) McMurray | A river in British Columbia. |
| (f) Norman | A town in Alaska on the Alaska Highway. |
| (g) Oregon | A town on the Mackenzie river where oil is refined. |
| (h) Bonneville | A smelting centre in Washington state. |
| (i) Tacoma | An American Pacific state. |
| (j) Trail | A dam on a salmon river. |

75 Here are some of the largest towns and cities in or near the coniferous forests of North America. Draw a map and put in these towns, making the size of the dot according to the size of the town. The figure usually includes suburbs.

Montreal	2,437,000
Toronto	2,158,000
Seattle	1,230,000
Portland	372,000
Quebec	413,000
Ottawa	450,000
Vancouver	892,000
Tacoma	215,000
Halifax	188,000
Sudbury	112,000
St. John	101,000
Prince Rupert	12,000
Fairbanks	13,311
Norman	46,000

76 Arrange the following names correctly in these groupings: coniferous trees, deciduous trees, products of the coniferous forests, forest animals, states of the U.S.A., provinces of Canada, rivers, lakes, mining and smelting towns, other towns. Larch, Turpentine, Alaska, Yukon, Gold, Birch, Tar, Prince Edward Island, Oregon, Tacoma, Pine, Cellulose, St. John, Erie, Aspen, Pitchblende, Trail, Sitka, Beaver, New Brunswick, Quebec, Peace, Great Slave, McMurray, Kitimat, Resin, Fir, Celluloid, St Lawrence, Radium, Spruce, Acetic Acid, Ottawa, California, Maple, Mackenzie, Labrador, Halifax, Asbestos, Cellophane, Douglas, Ermine, Uranium, Alberta, Huron, Edmonton, Athabasca, Fairbanks, Washington, Uranium City, Otter, Varnish, British Columbia, Fraser, Artificial silk, Magnesium, Racoon, Matanuska, Sudbury, Nickel, Montreal, Alcohol, Mink, Balsam, Marten, Annapolis, Hemlock, Nova Scotia, Ontario, Superior, Toronto, Great Bear, Redwood, Columbia.

77 There is a hidden name in each of the following sentences. They are the names of animals, trees, places etc. mentioned in this section. Find the hidden names and write a sentence about each.

- On the Ontario map, lead, gold and silver mines are shown.
- The logs slide down a semi-circular chute at great speed.
- Tarred wood is used for the salmon traps.
- Few animals are smart enough to avoid the trappers' snares.
- The pulping machines do not shred deciduous timber.
- It is no fun dying of exposure in northern Canada.
- The maple sugar collector on tour visits his trees early in the day.
- To destroy the forest was a mistake man ought not to have made.
- At first farmers used neither fertilisers nor manures for their crops.
- By what date had almost all the gold ore gone from the Klondike?
- The Canadian National Railway is a government railway.
- You may let the rascal ask a question, but you need not answer.
- The history of Canada shows how man can adapt many natural forces to his purposes.

78 Find the odd one out in each of the following groups and say why.

- Sitka, Douglas, Pine, Aspen, Redwood.
- Sitka, Larch, Douglas, Pine, Spruce.
- Birch, Balsam, Spruce, Maple.
- Nova Scotia, Oregon, Quebec, Alberta, British Columbia.
- Oregon, Washington, California, New Brunswick.
- Superior, Great Slave, Athabasca, Great Bear.
- Fraser, Mackenzie, Erie, Ottawa.
- Mackenzie, Columbia, Fraser, Ottawa.
- Ottawa, Toronto, Sudbury, Tacoma, Edmonton.

79 The heads and tails of these sentences have been mixed. Write them out correctly.

- | | |
|--|--|
| (a) The Indians of the Pacific coast. | are hunters and herders of reindeer. |
| (b) The finest stands of timber | are found in northern Canada. |
| (c) The extreme north of Canada. | is too dry for trees to grow. |
| (d) The Eskimos north of the coniferous forest | lived mainly on salmon. |
| (e) Salmon fishing is carried on mainly | during the frozen winter months. |
| (f) Coniferous forests composed of stunted trees | are found on the Pacific coast of North America. |
| (g) The centre of southern Canada | is too cold and wind-swept for trees to grow. |
| (h) Lumbering in eastern Canada is carried on | during the late spring and summer. |
| (i) The power to drive Toronto's factories comes | by cable from Kemano. |
| (j) The St Lawrence Seaway | links the far north-west with the U.S.A. |
| (k) The best pulp paper is made | from pitchblende. |
| (l) The Lake Peninsula | is famous for apples. |
| (m) The aluminium works at Kitimat obtain power | from the Niagara Falls hydro-electricity station. |
| (n) Radium is obtained | from the wood of eastern Canada. |
| (o) The Annapolis valley | produces huge quantities of cheese. |
| (p) The Alaska Highway | leads from the Atlantic to the heart of North America. |

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